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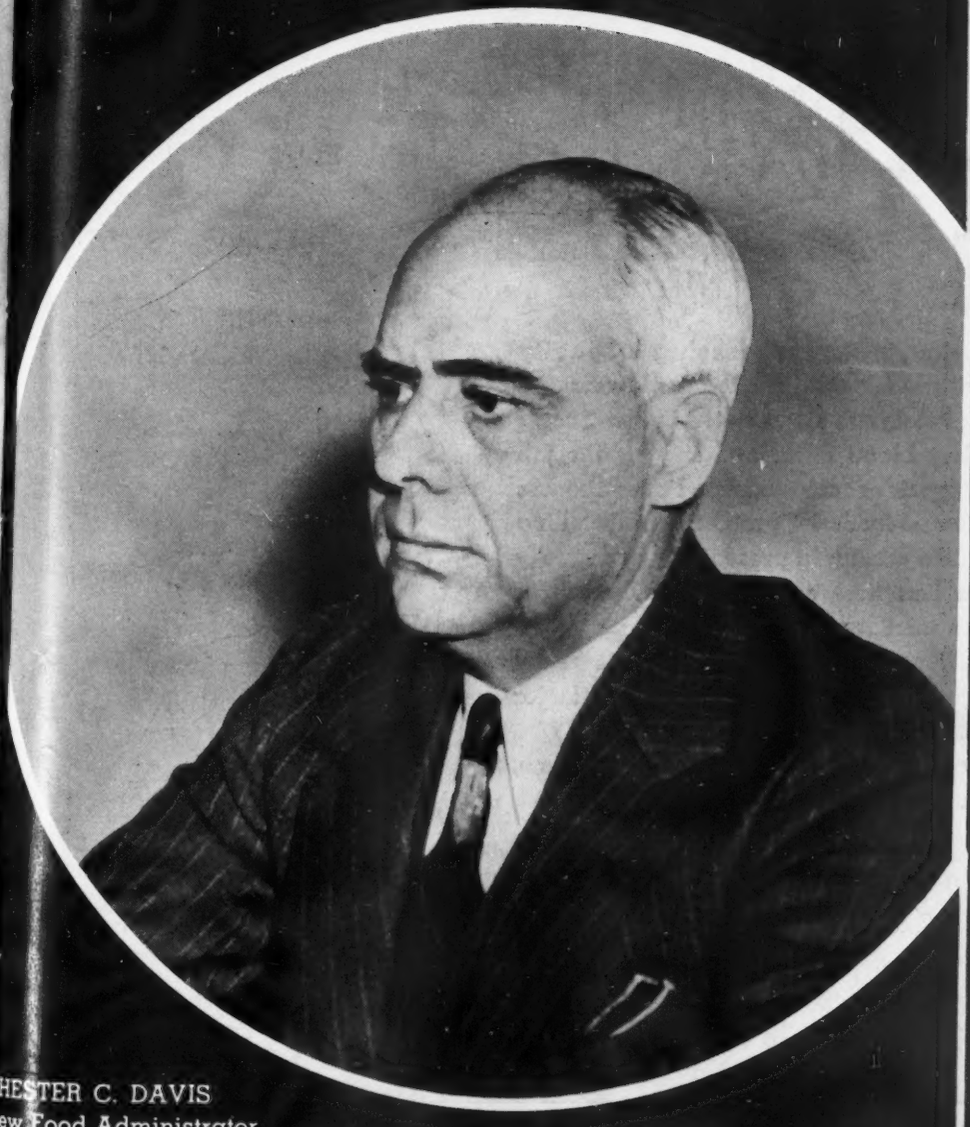


HESTER C. DAVIS
ew Food Administrator
t the processing job ahead see editorial on page 47

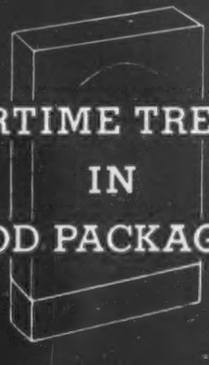
APRIL 1943

Why Britain Sells Lend-Lease Foods

A Challenge to Food Technologists

Fruit Dehydration Offers Advantages

Dehydration in Community Plants



WARTIME TRENDS IN FOOD PACKAGING

McGRAW-HILL PUBLICATION

BECAUSE SPEED IS IMPORTANT...
Let
PORTER MIXERS
do the job
Porter Side-Entering Agitator
Designed for installation in vessels where it is impractical to use a vertical-shaft agitator. A sturdy, substantial piece of equipment for the typical fluid mixing job.
PORTER
Porter Flange-Mounted Agitator
An ideal agitator for closed tank applications where propeller-type agitation is desired. Geared or direct drive.
Porter Portable Mixer
Easily moved from vessel to vessel and quickly attached. Geared and ungeared models in all sizes.
ARMY E NAVY
PORTER
"Better Built"
Equipment
Established 1866

Today, with processing capacity crowded to the limit, Porter Mixers and Agitators are appreciated by their users more than ever. Because they blend faster and stay on the job longer without shutdowns for repair or maintenance, Porter Process Equipment is meeting the demand for faster production. Installing a Porter Mixer or Agitator is like adding to present vessel capacity —batches are completed in less time and vessels released for re-charging more often in the same length of time.

Another advantage of Porter Process Equipment is its ready adaptability to a wide range of operations—an important factor in these days of rapid development in process industries.

If you want dependable operation over a long period of time, begin now to standardize on Porter Equipment.

PORTER BUILT MEANS BETTER BUILT

H. K. PORTER COMPANY, Inc.

Process Equipment Division — Pittsburgh, Pennsylvania

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THE COVER

By order of the President on March 25, Chester C. Davis was named Food Administrator to succeed Claude R. Wickard. Mr. Davis was president of the Federal Reserve Bank of the St. Louis district and formerly was AAA administrator.

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McGRAW-HILL PUBLISHING COMPANY
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Signed .....

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"From PNEUMATIC MACHINES... thousands of vital packages every hour!"

Pneumatic Packaging Machines throughout the country are playing a major role in mass production of Powdered Eggs and of Ration K, the Army field ration unit. Powdered Eggs are an enormously important item in provisioning our Allies through Lend Lease. Army Ration K is a vital food unit for our fighting forces.

Manufacturers already in production on these two important products have found several different ways of equipping themselves with suitable packaging machines. Some packaging machines previously used on a peacetime product can be converted to handle these products—easily and quickly: a few change-over parts and they are ready to roll. Other manufacturers have salvaged "worn out" machines. Another group have found it necessary to purchase new major parts of machines or entire new machines.

Whatever your conversion problem may be in changing over to produce packages essential to winning the war, consult Pneumatic first. You'll find us prepared to give you—as always—expert advice and reliable guidance.

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PACKAGING & BOTTLING MACHINERY

PNEUMATIC SCALE CORPORATION, Ltd., 91 Newport Avenue, North Quincy, Mass. Branch Offices: New York, Chicago, San Francisco, Los Angeles.

FOOD INDUSTRIES is published monthly. Price 35c per copy. Allow at least ten days for change of address. All communications about subscriptions should be addressed to the Director of Circulation, Food Industries, 330 West 42nd St., New York, N. Y. Subscription rates: United States and possessions, Mexico, Central and South American countries, $3 a year, $4 for two years, $5 for three years. Canada, $3.50 a year; $5 for two years; $6 for three years (payable in Canadian or U. S. Funds). Great Britain and British possessions, 30 shillings for one year, 60 shillings for three years. All other countries, $5 a year, $8 for two years, $10 for three years. Entered as second-class matter, Aug. 17, 1936, at Post Office, Albany, N. Y., under act of March 3, 1879.

Over 4000 combat planes a month — the staggering production of America's great aviation industry — more evidence of the ability of private enterprise and free men to overcome any odds when Freedom itself hangs in the balance. More and more Howell Motors are being used by the aviation industry and all other vital industries today.

AMERICAN AIR POWER - - - Howell Motors help build it!

Air power! Air superiority on every front!

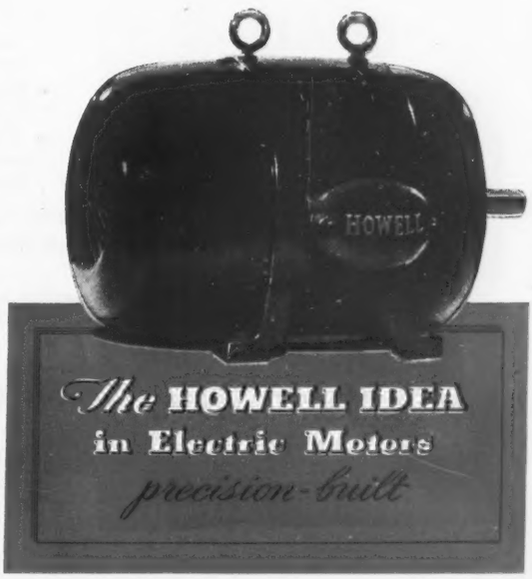
That's the goal every aircraft plant in America is driving toward for Victory!

After Victory, American Industry must continue to go forward—must not lose the new momentum of production if the needs of an awakened world are to be fulfilled.

We are, all of us, working and fighting to perpetuate the American way — the only way that will make possible more liberty — a richer, fuller life, more happiness and security for all when Victory is ours.

We're building Howell Motors today just as we've always built them — to the highest standards of quality and precision.

For dependable performance in war work . . . for dependable performance after the war — look into the Howell Idea in Electric Motors.



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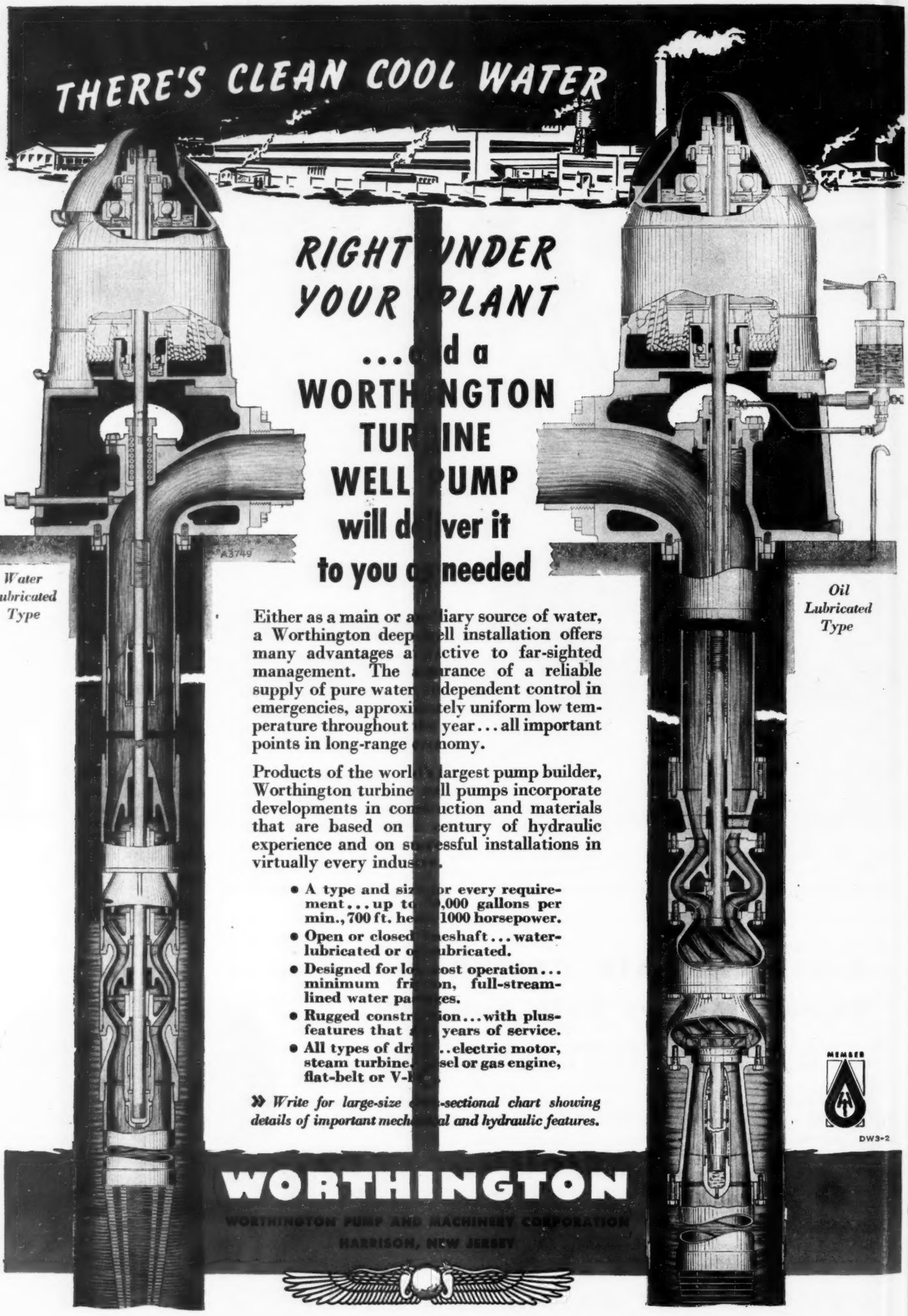
HOWELL • *Manufacturers of Quality Motors Since 1915* • **MICHIGAN**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RIGHT UNDER YOUR PLANT
...and a WORTHINGTON TURBINE WELL PUMP will deliver it to you as needed
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Either as a main or auxiliary source of water, a Worthington deep well installation offers many advantages attractive to far-sighted management. The assurance of a reliable supply of pure water, independent control in emergencies, approximately uniform low temperature throughout the year... all important points in long-range economy.
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GENTLE HANDLING . . . DUST-TIGHT OPERATION
WITH THE
LINK-BELT Bulk-Flo
CONVEYOR-ELEVATOR-FEEDER

Bulk-Flo is outstanding in its ability to cut handling costs and to conserve critical materials and save space. It minimizes breakage and degradation, prevents leakage and reduces explosion and fire hazards. The necessity for multiple elevating and conveying units is eliminated, because the same unit conveys horizontally, vertically or on an incline.

Bulk-Flo is self-feeding, self-discharging and to a high degree self-cleaning. It handles flowable, granular, crushed, ground or pulverized materials of a non-abrasive, non-corrosive nature under all conditions of loading. Send for catalog No. 2075.

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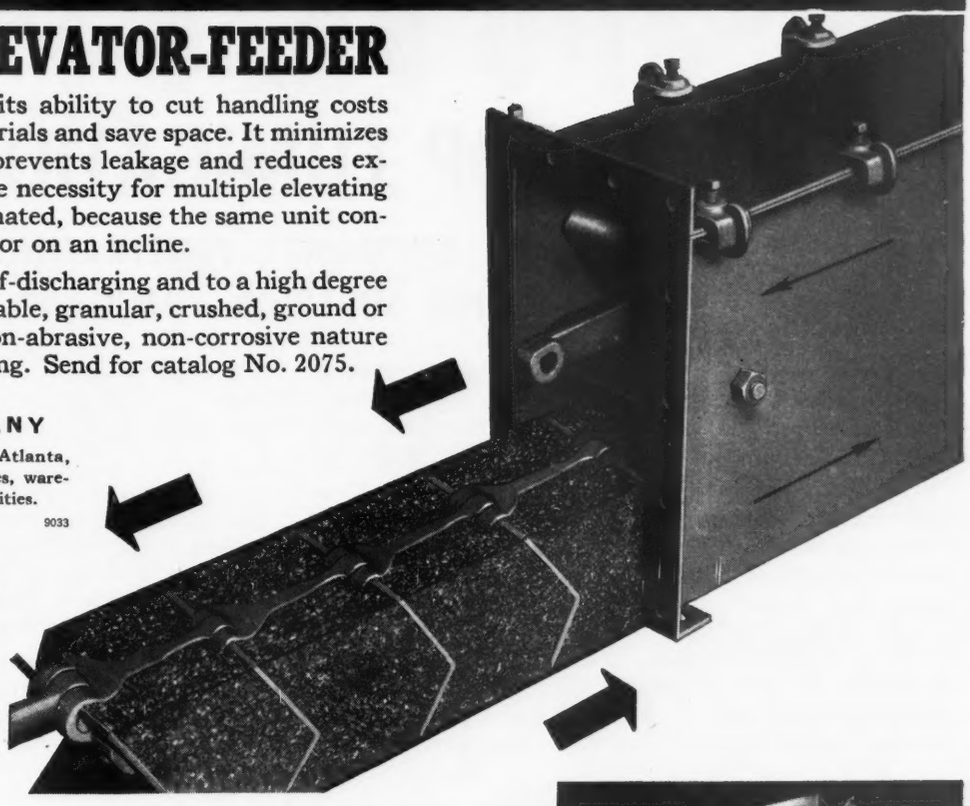


DUST-TIGHT casing prevents leakage. Bulk-Flo conveys and elevates material in a dust-tight casing, making it suitable for handling dusty products. It is successfully used for handling foodstuffs and chemicals where avoidance of contamination or exposure is of prime importance. These illustrations show the construction of casing and flights.

SLOW SPEED

Operating at slow speed Bulk-Flo is recommended for materials that require careful handling . . . minimizes breakage and degradation.

SPLIT DISCHARGE REDUCE DEGRADATION

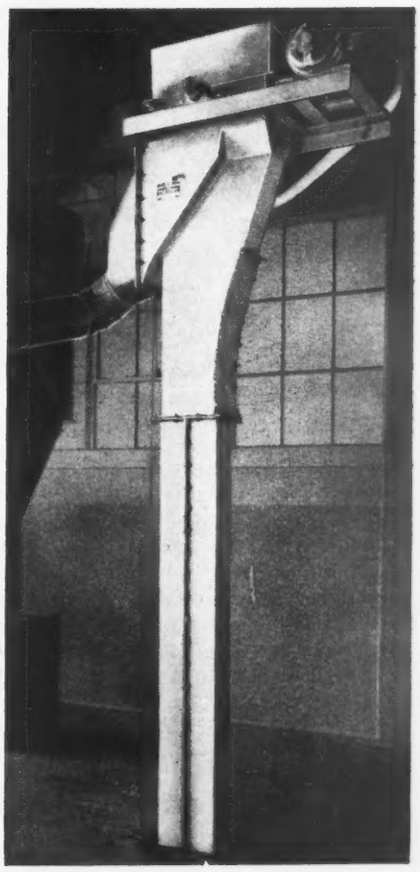
Most of the material falls forward immediately upon reaching gathering chute. The remaining material discharges rearwardly onto chute and flows forward.

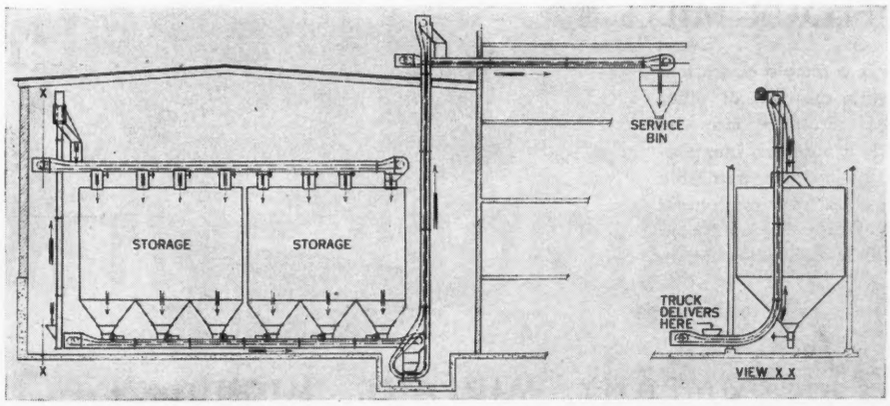
COMPACT DRIVE →

Motorized reducer and chain drive are safe, compact, fully enclosed, easily accessible. Speed changes readily made by changing one sprocket.

SAVES SPACE →

Compact Bulk-Flo casing is so small as to be comparable to a building column. The material moving in a continuous mass occupies almost the entire capacity of the enclosure.





Five Bulk-Flo units with automatic controls handling granulated sugar from trucks to storage bins at 30 tons per hour and transferring from the bins to a service hopper at 7½ tons per hour.

DOW METHYL

SHOWS TOP FUMIGATION RESULTS

WARTIME USES EMPHASIZE PENETRATING POWER OF THIS SUPERIOR FUMIGANT

The job of protecting the largest production of food in the nation's history has created many wartime problems. Danger of infestation is greater than ever before and the best protective methods must be called into service.

Methyl Bromide is helping to solve these problems—achieving successful results even under the most difficult conditions. It is recognized by outstanding fumigation experts for its remarkable penetrating powers. This, coupled with versatility of application under wartime difficulties, is making it increasingly important in nearly every field. Methyl Bromide reaches into the heart of every bag and package and effects a complete kill of insect life, from egg to adult.

It is easy to use, and can be employed with a minimum of equipment in warehouse, mill, tarpaulin, box car and vault fumigations.

The Army, too, makes use of Methyl Bromide. Here again its high penetrating power, combined with its ability to kill insects in all stages of development, makes it a favored fumigation material. In the recent African landings, every group of soldiers carried Methyl Bromide to keep uniforms and equipment free from insect infestation.

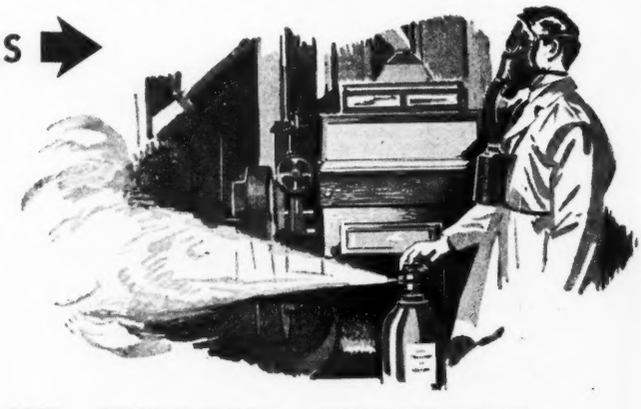
Described and illustrated below are the many ways this versatile fumigation material can be employed. For detailed information on specific Methyl Bromide applications, write to The Dow Chemical Company.

WAREHOUSE

Stocks of food in warehouse storage demand a fumigant that will penetrate large stacks. Methyl Bromide's exceptional penetrating powers enable it to effect a complete kill of all insects in either the egg or active stages. Cylinders are simply placed throughout the warehouse and the gas released. Gas may also be applied from outside the building through a simple, inexpensive piping system. When the fumigation is complete, Methyl Bromide's high diffusion rate permits rapid, easy venting, so that normal operations can be resumed quickly. Thus, neither buildings nor supplies are long held up by the operation.

FLOUR MILLS

Application of Methyl Bromide in flour mills is a simple operation. Special equipment ordinarily associated with the use of other fumigants is not required because Methyl Bromide may be applied either directly from the cylinders, or through an inexpensive space piping system. (Details on this method are available on request.) Removal of accumulated mill stock from equipment is not necessary, as Methyl Bromide completely penetrates such accumulations. Most important—complete kill is assured—even in the center of 140-lb. bags of flour!



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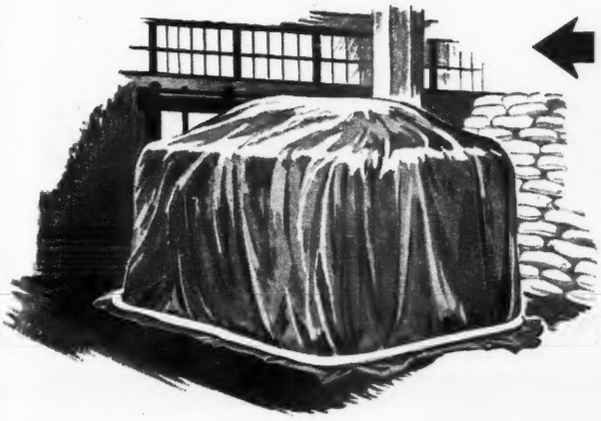
BROMIDE

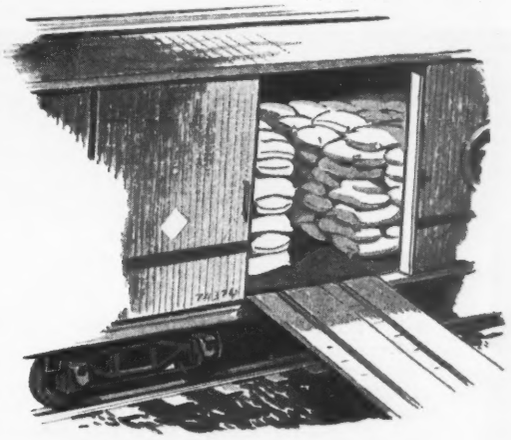
IN FIVE FIELDS . . .



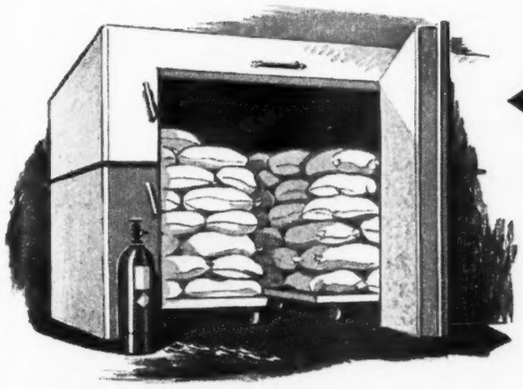
TARPAULIN

A plastic-treated tarpaulin perfected by Dow, used in combination with Methyl Bromide, makes possible "on the spot" fumigations—in large buildings not suitable for ordinary fumigations, on loading platforms, and even on outdoor storage stacks, where huge wartime stores are built up and proper fumigation facilities are not at hand. This method saves time, money and food. Stacks are covered by the tarpaulin weighted down by a "sand snake," and Methyl Bromide is released from the outside. Entire operation is simple and effective.

BOX CAR



Methyl Bromide has special value as a box car fumigant—assuring the delivery of insect-free products. The car may be fumigated before it is released, or when it arrives at the destination. Methyl Bromide is applied quickly and easily from outside the car through the use of simple, inexpensive equipment. Here again, penetration throughout the load completely eliminates insect life.



CHAMBER

Methyl Bromide offers distinct advantages as a vault fumigant. Its high diffusion rate makes possible quick, easy application—with no need for special pressure equipment. The fumigant penetrates completely every container or package, including those used for food shipments to the armed forces. Methyl Bromide vents rapidly, and fumigation cycles are speeded up—permitting the treatment of large quantities of food within a short period. Detailed information on vault construction is available from Dow.

METHYL BROMIDE

THE PENETRATING FUMIGANT

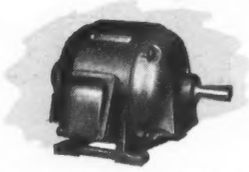
DOW

CHEMICALS INDISPENSABLE TO INDUSTRY AND VICTORY

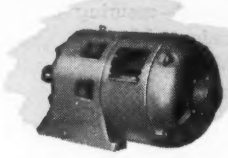
SETTING UP for

G.E. CAN HELP YOU GET "LINED UP"

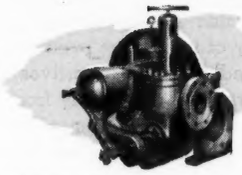
FOR DRIVING POWER



G-E "TRI-CLAD" INDUCTION MOTOR—for cutters, grinders, conveyors—wherever a well-protected standard motor is needed. Available in SPLASHPROOF construction (as shown) for wet locations. Full range of sizes, types, speeds.



G-E GEAR-MOTOR—Motor and speed reducer are combined in a single, compact unit. Simplifies mounting, promotes safety. For any single-speed requirement down to 13.5 rpm.



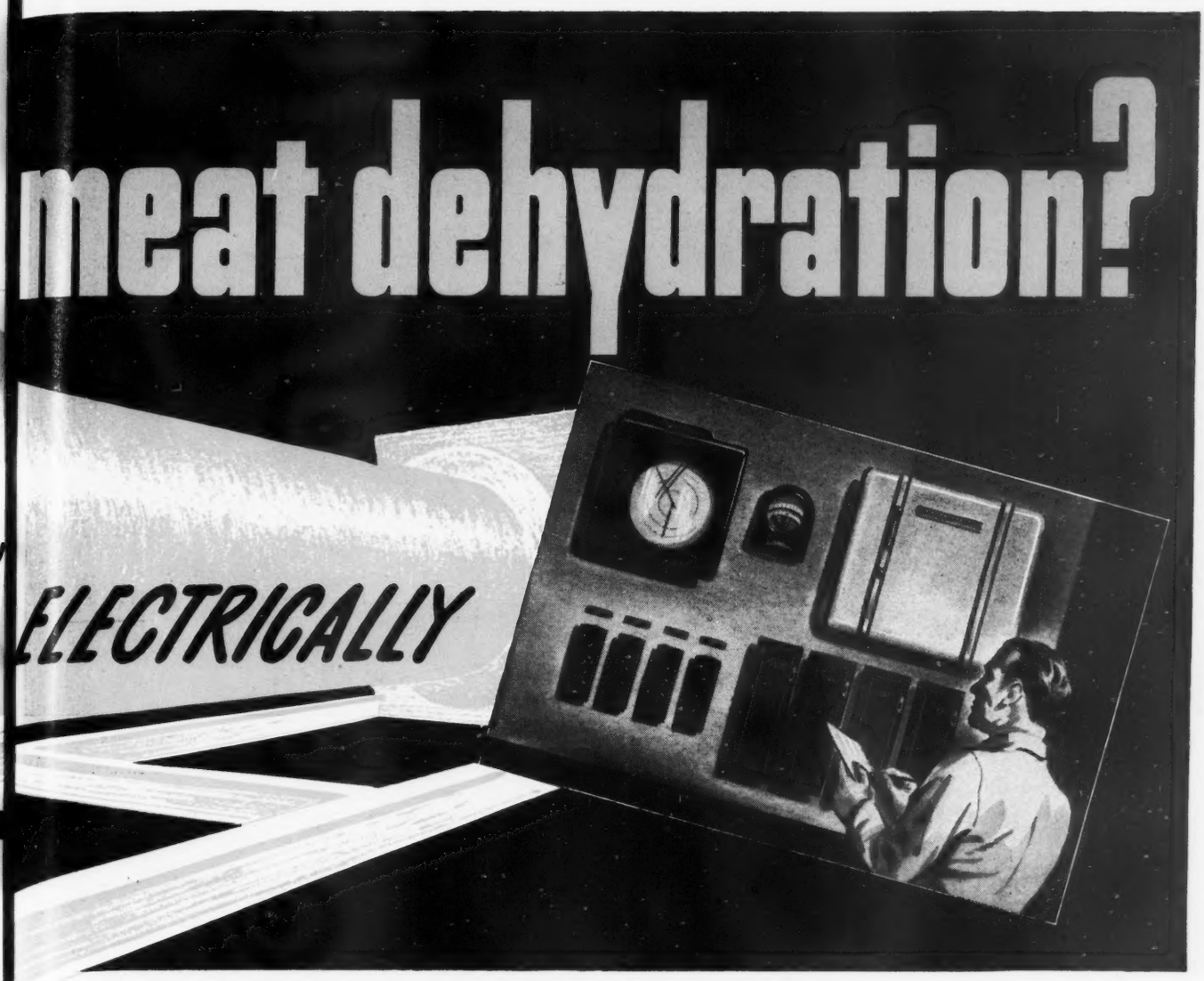
G-E MECHANICAL-DRIVE TURBINE—Supplies low-cost power while acting as a reducing valve to furnish low-pressure process steam. G.E. builds them in ratings from 5 hp up.

FOR PROCESS CONTROL

G-E MOTOR CONTROL—A popular choice for food-plant drives is the CR7008 combination starter, with circuit switch and fuses in a single self-contained unit. G.E.'s wide range of types meets the needs of every kind of drive.

G-E TIME SWITCHES—They keep tabs on operating cycles, opening and closing contacts as required to hold elapsed time to split-second limits. Easily linked with temperature control in combination time-temperature circuits.

G-E PUSH BUTTONS—G-E Application Engineers can help you select the right accessory control equipment to put an entire processing operation under control from a single station where temperature recorders and other instruments are located.



Has war brought you new food-processing problems? Are you setting up for dehydration of meat, vegetables, milk, or eggs? Are packaging changes altering your production routines? Are you mechanizing your operations to meet a man-power shortage?

Whichever problems in food technology may concern you, G.E. is ready with the engineering help you need to choose the right electric equipment to boost output or improve product quality.

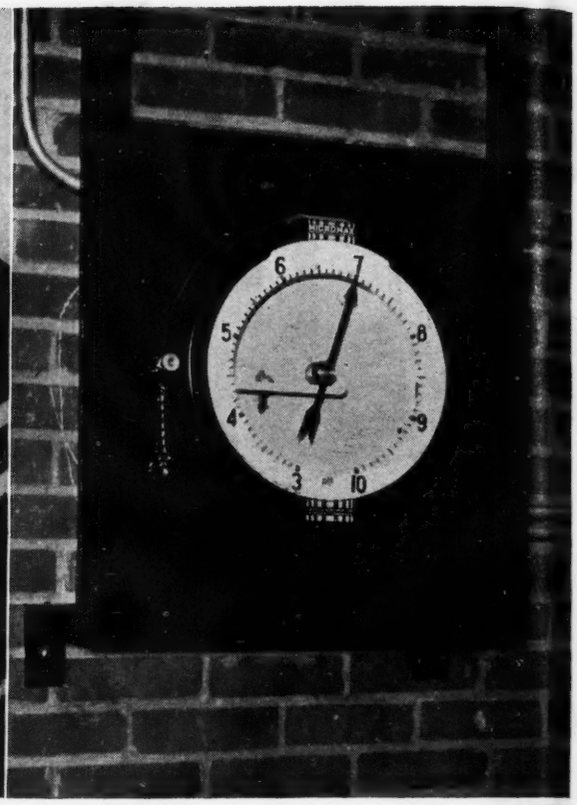
Whether you're planning new developments in dehydration, canning, freezing, or some other process, G-E Application Engineers will work with you to make your entire production line an electrically integrated unit, thus speeding up installation, simplifying operations, and cutting maintenance cost.

A call to your local G-E office will put you in contact with men competent to tackle your particular food-plant electrification problem. *General Electric, Schenectady, N. Y.*

GENERAL ELECTRIC

653-2-110

Zeolite Chemical Co., quarriers and processors of greensand, use this L&N Glass-Electrode pH Indicator to check the performance of their product in their laboratory. Easy-to-use features, and accuracy, appeal to them.



A large pulp mill uses this Round-Chart Micromax Recorder to show pH of effluent water from an automatic continuous water-softener. Raw water comes from a stream.

USING CONDITIONED WATER FOR WAR WORK?

These pH Instruments Help Maintain Water Quality

Checking the pH of water is a job in which L&N equipment can help all the way from the stream, lake or well to the process tank or boiler.

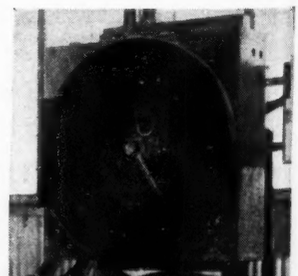
For laboratory use, we recommend Glass-Electrode Indicator No. 7662. This instrument reads directly in pH and retains its full accuracy at temperatures up to 85 F (30 C) in atmosphere of 95 per cent relative humidity. It has a temperature compensator which eliminates correction computation. The Indicator can be used day in and day out with practically no maintenance. The little attention it requires consists of filling the reference electrode's salt bridge with KC1 crystals every 6 or 8 weeks, and occasionally cleaning electrodes or replacing batteries. Electrodes are filled and sealed at the factory. This Indicator is furnished with all accessories and supplies. For details, see Catalog E-96(2), sent on request.

Micromax pH Recorders. For continuously checking the pH of continuous water-conditioning equipment, we recommend the Micromax pH Recorder. This is available in either the Round Chart Model, shown above, or in the Strip-Chart Model. Both use glass electrodes. Both are amply accurate for any industrial use, though the Strip-Chart, having a greater width of calibrated scale, is slightly higher in precision than the Round Chart, whereas the Round Chart is readable from a greater distance. The usual range is 3-10 pH for either instrument, in water-works service. For details, see Catalog EN-96, sent on request.

Keeps Temperature Secret

Here's how a rubber concern maintains secrecy about the true temperature inside a Banbury Mixer. Instead of throwing the Micromax Recorder's temperature record up-scale or down, this firm has the Micromax calibrated in millivolts, and does not identify the type of thermocouple.

Because of its sturdiness and ease of mounting, Micromax is particularly well suited to use where vibration from mixers or other machinery is a factor. For particulars, see Catalog N-33A.



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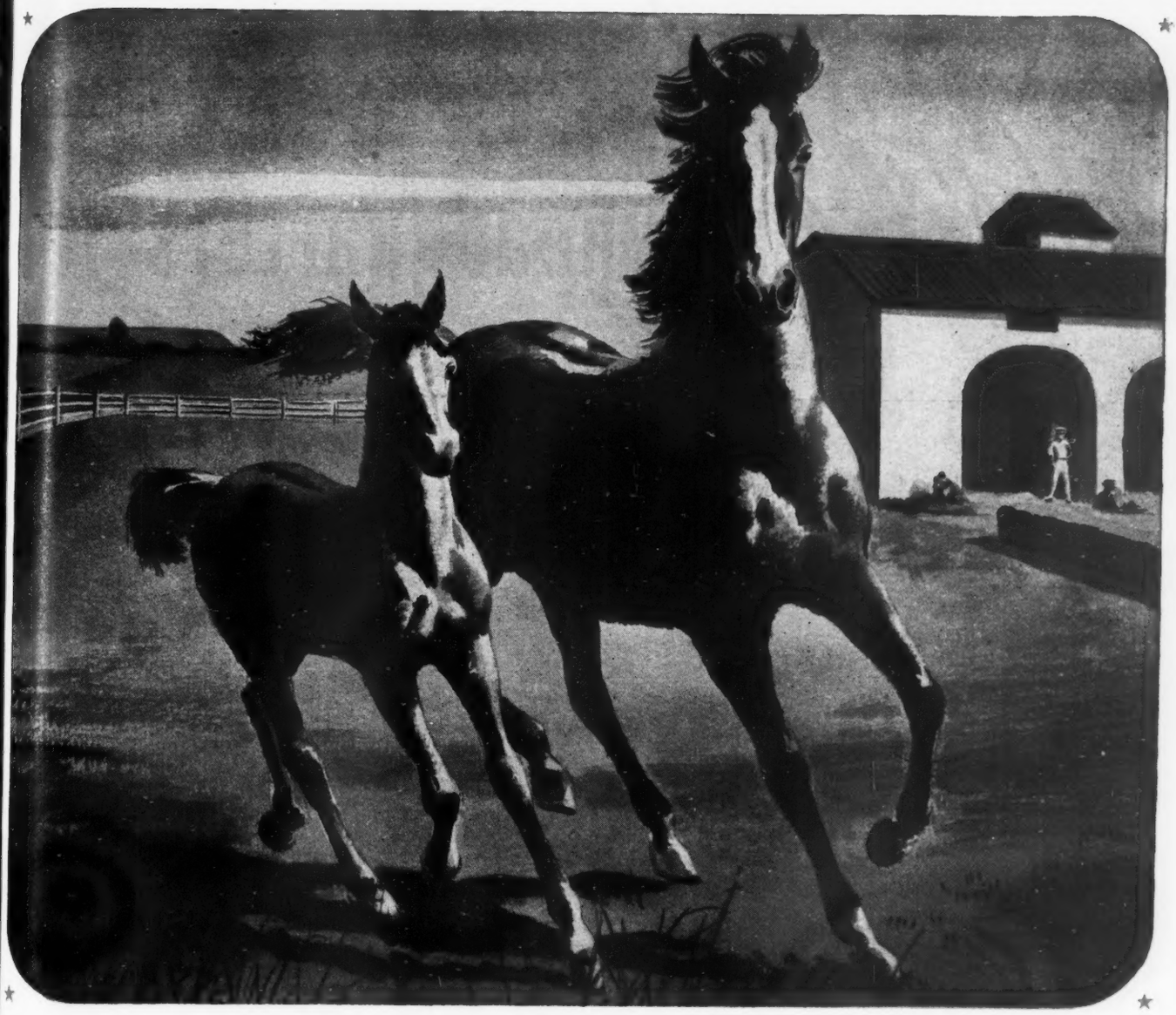
LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES



PLURAMELT...YOUNGSTER WITH A FUTURE

TODAY, Pluramelt products are entirely allocated for essential purposes. In fabricated form, they're serving in mess trays aboard ship—in field ranges—in kitchen and hospital equipment for the services—in the manufacture of synthetic rubber, high-octane gas, explosives, etc. The list includes both the single and double stainless-armored types.

In each case, of course, Pluramelt is used instead of *solid* stainless steel. The chief reason, therefore, is the very important matter of conservation. Pluramelt saves 60% to 80% of the vital chromium and nickel that solid stainless would consume for the same job.

But there are other prime considerations. Pluramelt in general fabricates easier than solid stainless steel. And, under any conditions of fabrication and subsequent service, it does not—*cannot*—come apart. Pluramelt is unique—a controlled composite steel with an *intermelted* bond that cannot be separated.

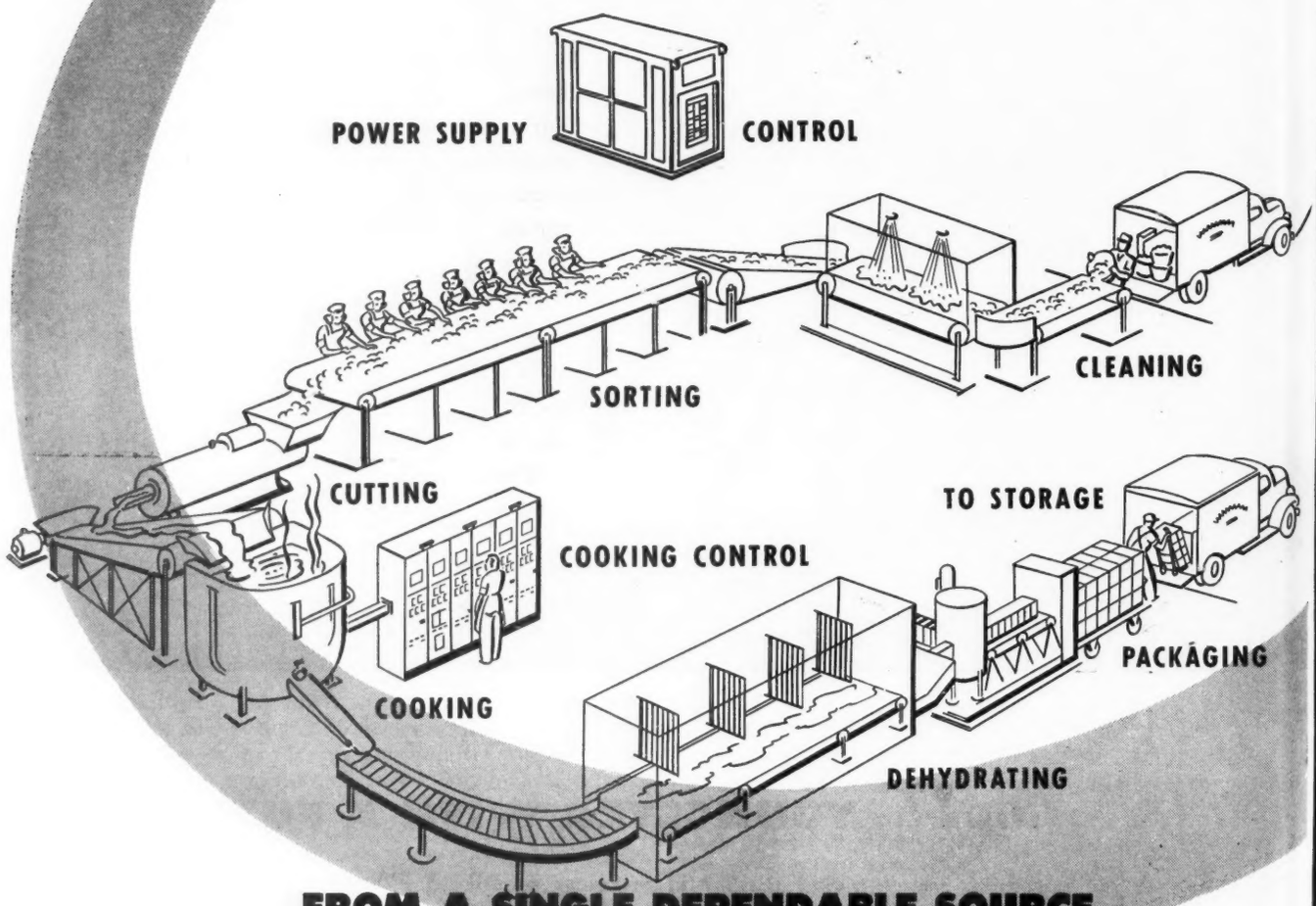
Do you want to know more about this stainless-armored steel that is so sure to bulk large in the peacetime manufacturing of the future? A brand new booklet on the subject of *"Pluramelt Stainless-Armored Steels"* is now ready. Write for your copy.

ADDRESS DEPT. FI-2

Allegheny Ludlum
STEEL CORPORATION
BRACKENRIDGE, PENNSYLVANIA

A-8827 . . . W & D

Westinghouse is headquarters for



FROM A SINGLE DEPENDABLE SOURCE

MOTOR DRIVES
- Splash-proof motors
- Gearmotors
- Pump drives
- Blower drives
- Conveyor drives
- Cutter drives
- Grinder drives
- Dehydrator drives
- Packaging machine drives

CONTROLS
- Motor starters
- Circuit breakers
- Water or dust-tight enclosures
- Control centers

ELECTRICAL SYSTEMS
- Distributor apparatus
- Unit substations
- Transformers
- Capacitors

STEAM EQUIPMENT
- Stokers
- Ash evacuators
- Steam jet vacuum pumps
- Mechanical drive turbines

LIGHTING
- Outdoor
- Interior
- Fluorescent

STERILAMP

PRECIPITRON

ELECTRONIC CONTROLS, SORTERS, COUNTERS

FOOD DEHYDRATION EQUIPMENT

BOTH ELECTRICAL AND STEAM

Westinghouse application engineers can offer you unbiased advice as to the use of steam or electrical equipment for your food dehydration plant. Standard Westinghouse power units are available for every drive in your dehydration process—whether it is for pumps, blowers, conveyors, cutters and grinders, dehydrators or packaging machinery.

And undivided responsibility is represented in the ability of Westinghouse to engineer a complete plant, from stokers and ash evacuators, mechanical drive turbines, to complete distribution systems, unit substations, transformers, circuit breakers and control centers.

Nor does Westinghouse service to the food industry stop there. Included in the list of products ideally suited for application in dehydration plants and other food processing operations is a complete line of lighting equipment, and such specialized items as Precipitrons for dust control, Sterilamps for bacteria-growth control, and electronic controls for sorting, counting and other operations.

Information on all of these products, plus the experience of Westinghouse application engineers, gained in years of consulting experience with industry, is available to you at no charge. Phone or write your nearest Westinghouse representative for this valuable assistance in planning the electric and steam requirements of your plant.

J-94557

Get this binder of detailed facts on the types of Westinghouse equipment offered for application in dehydration and other food processing plants. Write today—Application Data and Training Section, Dept. F-1, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pennsylvania.

WESTINGHOUSE

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

TIME SAVER FOR THE FOOD INDUSTRY

AN AMERICAN INSTITUTION WORKING WITH AND FOR AMERICA

A Man's Gotta EAT to Work to Win . . .

America's manpower must keep producing at its peak for Victory. War production with its long hours and strenuous effort lays heavy toll upon the stamina of the nation's workers. In mines, mills, factories and plants of every description, as also in their homes, those battling on the home front need wholesome nutritive food — now more vital than in peace time. Long journeys and wide time lapses between food production and consumption demand invulnerable food-protective-packaging. Spoilage, shrinkage and contamination *must* be kept to a minimum during shipment and storage. The Rhinelander mills bring a specialized experience of nearly 50 years standing to this vital war-time need.

Folke Becker

PRESIDENT
RHINELANDER PAPER COMPANY

RHINELANDER PROTECTIVE PACKAGING *Papers*

FROM THE BEST THAT'S MADE TO THE CHEAPEST THAT'S GOOD

Genuine Greaseproof
Coffee Bag Papers
Confectionery Papers
Cereal Wrapping Papers

Laminated Greaseproof Papers
Lard and Shortening Liners
Bakery Product Wraps
Coated Food Packaging Papers

Cracker Box Liners
Greaseproof Innerwraps
Glassine Papers, Plain, Colored & Embossed

Wax Laminated Glassine
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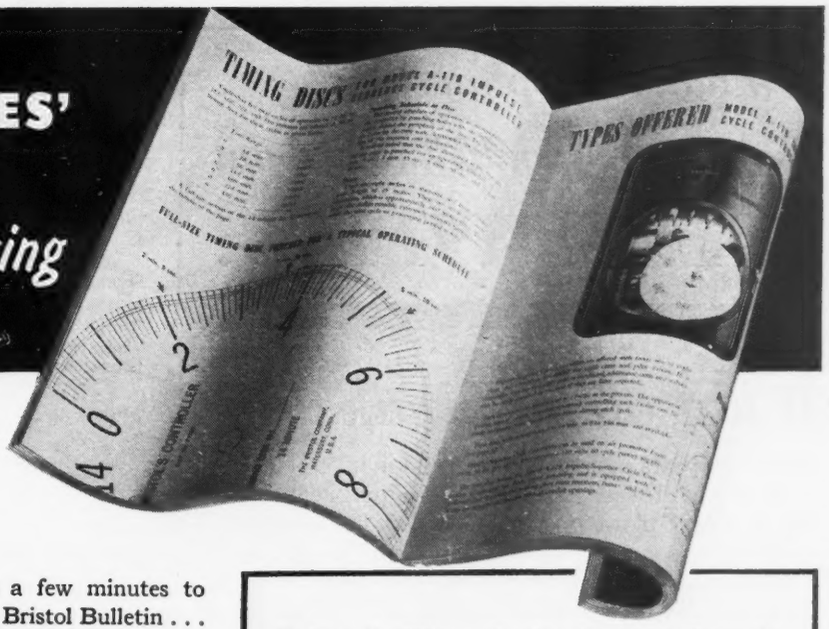
Packing Industry Wrappings—and Specialties to order

RHINELANDER PAPER COMPANY • MILLS AT RHINELANDER, WISCONSIN, U. S. A.

YOUR 5 MINUTES' READING
May Help His Fighting



When you take a few minutes to glance through a Bristol Bulletin . . . then write for further facts about Bristol's instrument-engineering in *your* industry . . . you may be taking the first step towards solution of one or more of the fundamental problems facing your plant today. Such problems as these, for instance, have often been solved by a wider, more efficient use of Bristol's automatic controls:—*1. Lack of skilled men . . . 2. Shortage of raw materials . . . 3. Need to increase output without increasing space or equipment. . . . 4. Unnecessary spoilage and rejects . . . 5. Errors in putting new products into production.*

Bulletin 572 — Typical of Bristol's Clear, Up-to-Date, Factual Information on Automatic Control of Mechanical Operations in Industrial Processes

Automatic timing of mechanical operations in industrial processes received its initial impetus when the Bristol Automatic Time-Cycle Controller was developed. Continuous improvements have been made through the years.

Here, in one concise 20-page bulletin, is a complete outline of this "template for efficient operation" — the mechanical operations you can control with it — the results in terms of quality, cost and increased production — details on its operation — and case studies illustrating its application to a wide variety of processes.

Bulletin 572 may point *your* way to a greater production efficiency than you have hitherto imagined possible. Write for it, together with any other bulletins described in the coupon.

THE BRISTOL COMPANY, Waterbury, Connecticut

The Bristol Co. of Canada, Ltd.
Toronto, Ontario

Bristol's Instrument Co. Ltd.
London, N.W. 10, England

BRISTOL

Engineers Process Control for Better Products and Profits

AUTOMATIC CONTROLLING AND RECORDING INSTRUMENTS

Bristol's Time Cycle Control Speeds Canning and Drying Processes

Automatic changes of temperatures, opening of dampers and valves, *on a pre-determined time schedule,* is becoming increasingly important to wartime canning and dehydration processes, where maximum, uniform production is necessary. Whether on vacuum, compartment or tunnel driers . . . or a series of retorts operated on time schedules . . . Bristol's Cycle Controllers insure exact repetition of best procedures, from beginning to end of the canning or dehydrating process.

FREE **Bulletins from Bristol's Library of Engineering Data — One of Them May Help You Increase Wartime Production**

THE BRISTOL COMPANY
115 Bristol Road, Waterbury, Connecticut

☐ Please send me Bulletin 572, described above. In addition send me any of the Bulletins checked below.

☐ Bulletin 536 — How to record and control pH value most efficiently with Bristol's potentiometers. Describes advantages of pH control and glass electrode method of measurement.

☐ Bulletin T-302 — How to select and install Bristol's Fully-Compensated Liquid-Filled Recording Thermometers (minus 125° F. to plus 400° F.) with complete facts, nomenclature and typical chart record.

☐ Bulletin 550 — Instruments for Dairy Industries are described in detail, together with installation data for many types of dairy equipments and typical charts for pasteurization, heating, cooling and storage temperatures.

NAME.....

COMPANY.....

ADDRESS.....

.....

What every plant operator should know about GLASS PIPING!

What about breakage?

Nearly 20 years of service under all kinds of plant conditions have proved that "PYREX Piping can take it" under actual plant operating conditions. Glass in this form is *not* as strong as metal, but workmen instinctively respect glass and quickly learn to handle it without breakage. With reasonable care in avoiding installation strains or sharp impact, PYREX Piping will give years of trouble-free service. The glass itself is very hard—about twice as resistant to abrasion as ordinary glass. Thus, it is particularly suitable for abrasive, corrosive slurries. PYREX Piping is recommended for working pressures up to 100 lbs. per sq. in. You can install and use this piping with confidence.

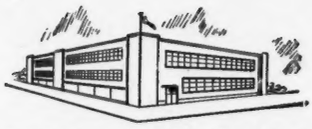
IS GLASS *PIPING* AVAILABLE NOW?

Yes. Glass-making materials are still fairly plentiful.

We do need priority ratings that enable us to get accessories (flanges, gaskets), to assign necessary labor, and to establish the position of your order in our production line. With such priorities we have been making 6 to 8-week deliveries.

Available sizes and lengths: 1″, 1½″, 2″, 3″, and 4″ diameters—and any length from 6 inches to 10 feet (longer lengths on special request). There are corresponding ells, tees, return bends, and reducers.

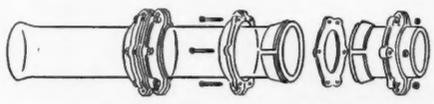
Accessories: Joints are compression type—with conical pipe ends compressed to a self-centering gasket by metal flanges and clamping bolts. We supply gaskets of materials suited to the liquid or gas you want to convey.



WHERE DOES IT GIVE BEST SERVICE?

Wherever product purity is essential or corrosion is troublesome . . . wherever ease of cleaning is a factor . . . wherever management takes pride in its modern plant equipment . . . there PYREX Piping is ideal.

Food and beverage plants use it because it is easy to clean and operators can *see* when it is clean—because it can be flushed with steam or strong, hot cleaning solutions without danger of breakage from thermal shock. They use it to demonstrate visually to visitors what is taking place inside the pipe lines. They use it because it helps to produce a purer product.



IS IT EASY TO INSTALL?

Plant workmen have found it easy to make installations themselves. In fact, green plant mechanics have recently done first-rate installations with PYREX Piping.

You may install from one piece to a whole system—for PYREX Piping may be joined to existing metal lines and equipment. And it is hung and supported much like other types of piping. (See photo at bottom of page). We do recommend that hangers and supports be padded, to minimize scratching.

WHAT DOES IT COST?

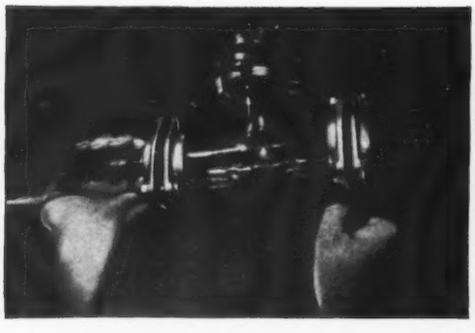
The initial cost of PYREX Piping (accessories included) is about the same or less than the cost of full-weight copper or brass piping, in comparable sizes, and is considerably less than the cost of stainless steel.

And because PYREX Piping does not wear out under acid attack, it gives long trouble-free service, with resultant low long-time cost.

The left-hand photograph at the bottom of the page is an example. That PYREX Piping has carried a slurry of crushed quartz and sulphuric acid for over eight years—without one cent of maintenance.

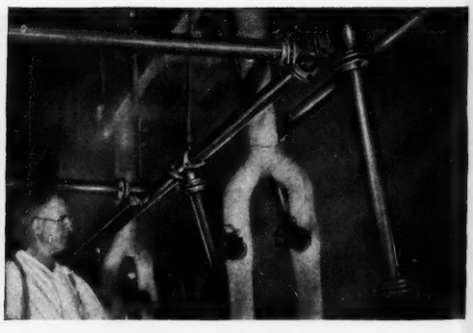
WATCH FOR CORNING ADVERTISEMENTS!

Watch this magazine for more information in Corning's advertisements headed "What every plant operator should know about Glass Piping." And Write for PYREX Piping Bulletin No. 814. Industrial Division, Corning Glass Works, Corning, N. Y. Branch Offices: New York, 718 Fifth Ave.; Chicago, Merchandise Mart.



PYREX Piping is easy to install and once installed it's there to give service over a period of years.

Glass Piping is used extensively in the plant of Chef Boyardi.



Corrosion by fruit and vegetable acids has no affect on this PYREX Piping carrying food products.

"PYREX" is a registered trade-mark and indicates manufacture by Corning Glass Works, Corning, N. Y.

CORNING
Glass Works
Corning, New York

Pyrex Industrial Glass
BRAND

LOUIS ALLIS

A Size and Type Electric Motor for Every Industrial Requirement

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

BUY WAR BONDS — BUY THEM REGULARLY.

268 capable and well equipped motor specialists stand ready to give prompt and efficient service on Louis Allis motors should the need arise.

They are located in about as many strategic spots throughout the entire United States.

A generation of constant effort has been spent organizing this army of motor-service "minute men."

Time and time again they have proved their merit by giving almost unbelievably quick emergency service—even in some of the most isolated spots in the country.

To machinery manufacturers especially—whose products are shipped to all parts of the country this type of service is invaluable.

THE LOUIS ALLIS CO., MILWAUKEE, WIS.

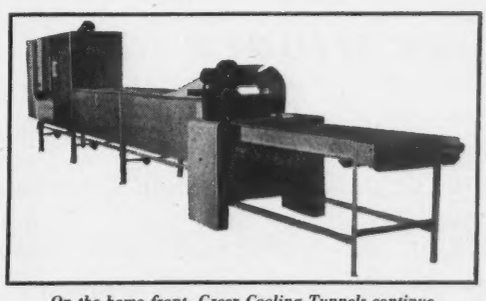
BUY WAR BONDS — BUY THEM REGULARLY.

IN THE CHINA SEA, TOO, GREER ENGINEERING IS *on Guard*

IT'S A FAR CRY from building candy and bakery machines to equipping submarines with safety devices. But Greer engineers have taken it in stride . . . though it's fair to admit that being "in the Navy" in wartime is no picnic for any plant. It's man's work, and we're proud to be giving it everything we've got.

Bold originality of design has always distinguished Greer equipment for the confectionery and bakery trades. Precision engineering, too, has long been the prime factor in all Greer production. Such engineering is of vital importance in wartime, when, for example, the lives of an entire submarine crew in a distant sea may depend upon it.

But don't for a moment think that we have forgotten our many good friends who are using Greer Confectionery and Bakery Machinery. What we are learning today is being put to work to guard *your* post-war future . . . and, of course, we want to help you now on any problem of maintenance or part replacement. Let us hear from you. J. W. Greer Co., 119 Windsor Street, Cambridge, Mass.



On the home front, Greer Cooling Tunnels continue to turn out the best in candies and biscuits.

MAKERS OF FAMOUS

GREER

MULTI-TIER CONVEYORS

Of every 10 Mack trucks built ten years ago—7 are still doing duty! Here Peter Helck sketches a "baby Mack" at dock-side.

ITS MIDDLE NAME IS . . . WORK!

Today's Mack trucks range in size from tough little one-tonners to the biggest Prime Mover in Uncle Sam's Army. But big or little—if its last name is Mack, its middle name is *work!*

For 43 years, the world has watched the way Mack trucks wade into the toughest jobs in trucking. That is why the phrase "Built like a Mack truck" is a part of our language.

Mack Trucks, Inc., Long Island City, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY . . . IF YOU PLAN TO GET ONE, YOU'RE WISE!

PERISHABLE — WRAP IN PLIOFILM

SEE FOR YOURSELF — *Be sure to see the mighty Pratt & Whitney airplane engine "packaged" in Pliofilm — at Booths 262-263, Packaging Exhibit, Hotel Astor, New York City, April 13-16.*

YOU don't usually think of airplane engines as "perishable" – but it takes only a little dampness in the air to rust and corrode their high-precision parts, especially when shipped overseas.

The former method of protecting engines against moisture-attack with a coating of heavy grease, inside and out, took from 50 to 75 man-hours to apply and remove – a labor bottleneck in wartime. This is now eliminated by shipping engines in hermetically sealed bags made of Pliofilm – Goodyear's unique water-moisture-vapor-proof wrap that was revolutionizing the packaging of foods, and all moisture-sensitive products, before its entire production was drafted for military service.

In Pliofilm, engines are being shipped everywhere, stored anywhere, and emerge bright and spotless, free from rust, ready for instant mounting. No other pliable, transparent packaging material has ever withstood so severe a moisture-test. That is why it will pay you to remember Pliofilm for after-victory packaging of all fine merchandise whose quality depends upon sealing natural moisture *in*, or keeping destructive moisture *out* – foods, pharmaceuticals, chemicals, tobacco, precision instruments and countless others.

To get a head start on your postwar package, write for information now. Address: Goodyear, Pliofilm Sales Dept., Akron, Ohio.

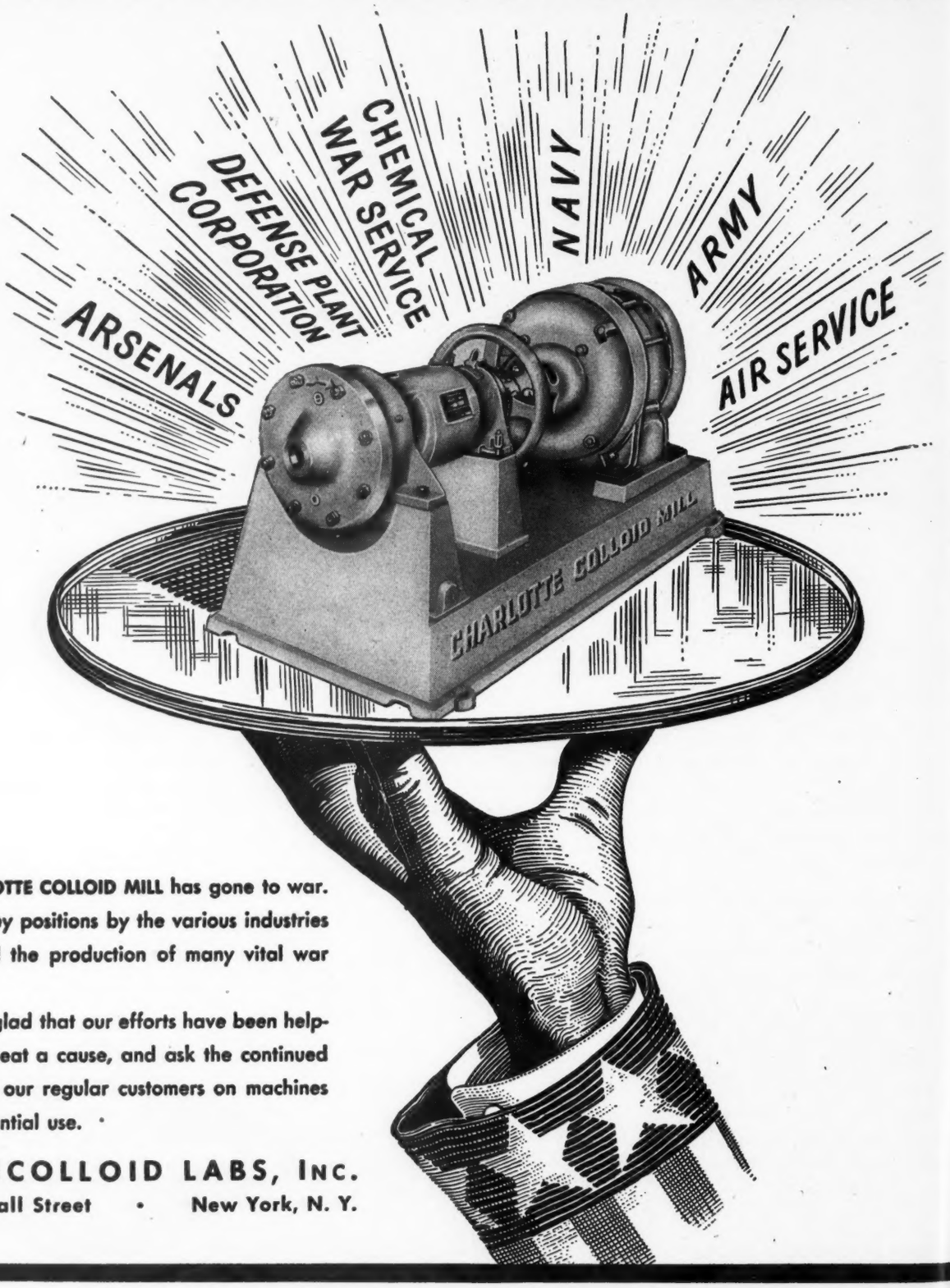
Pliofilm

GOODYEAR

THE GREATEST NAME IN RUBBER

Pliofilm—T.M. The Goodyear Tire & Rubber Company

THE Charlotte IS DOING ITS PART ON THE MANY PRODUCTION FRONTS!



The **CHARLOTTE COLLOID MILL** has gone to war. Its use in key positions by the various industries has assured the production of many vital war materials.

We are glad that our efforts have been helpful to so great a cause, and ask the continued patience of our regular customers on machines for less essential use.

CHEMICOLLOID LABS, INC.
44 Whitehall Street • New York, N. Y.

A mountain of sugar in St. Regis Paper Bags

100 lb. bags of sugar stacked 77 high, to the rafters . . . bags on the floor withstanding almost 4 tons pressure . . . bags on upper tiers taking the abrasion and tension of stackmen's shoes.

This photograph speaks volumes for the ruggedness and toughness of St. Regis Multiwall Bags. It explains why breakage, siftage and transit losses are greatly minimized. This is due to Multiwall construction; i.e. several plies of kraft paper in tube form, with each bearing its share of the burden. As required, special laminated or moisture resistant sheets are incorporated. Sugar is only one of the more than 300 products packed in Multiwall Paper Bags.

St. Regis offers you Multiwall Bags *custom*-built to fit your specific needs, also the *specialized service* of St. Regis engineers, plus the benefit of our long years of experience in manufacturing and installing bag filling and closing equipment. Let us study your packing operation and recommend the type of bag to protect your product and to meet your production needs.

MULTIPLY PROTECTION • MULTIPLY SALEABILITY

ST. REGIS PAPER COMPANY

TAGGART CORPORATION • THE VALVE BAG COMPANY

NEW YORK: 230 Park Avenue

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Offices also at:
Baltimore, Md. · Birmingham, Ala. · Dallas, Tex. · Denver, Colo. · Franklin, Va. · Los Angeles, Calif. · Nazareth, Pa. · New Orleans, La. · San Francisco, Calif. · Seattle, Wash. · Toledo, Ohio

File this under "Glass"

IF conversion to glass has been keeping you awake nights, look at this picture and see how easy it is. Believe us, it's almost as easy as it looks!

The photograph was taken at the Portland plant of the Starr Fruit Products Company. It shows the cookroom foreman loading a four-car retort with fancy Bartlett pear halves. But the most important part of the picture to you—the part that explains why glass package processing is no cause for alarm—is the upper left hand corner showing the Taylor Controls!

We can speak with some assurance, because we made our first temperature and pressure control installation for glass package processing as long as twenty years ago. And today the Taylor 2-A Retort Control System is known far and wide as a tested, proved method of keeping temperatures and pressures within the narrow limits required. To be specific, it can keep pressures within plus or minus 1 lb. during holding and cooling, and temperatures within plus or minus 1°F. during holding.

Ask your Taylor Field Engineer for the whole story! You'll find he not only knows his stuff, but he has behind him all the engineering research and experience of the entire Taylor organization. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow, and liquid level.

Taylor Instruments
MEAN
ACCURACY FIRST
IN HOME AND INDUSTRY

★ KEEP ON BUYING U. S. WAR BONDS AND STAMPS ★

FOOD PROCESSING MACHINERY

NEEDS TIMKEN BEARINGS

AS MUCH AS ANY

Make sure yours has them

It needs them to assure smooth, fast operation; to reduce power consumption; to simplify lubrication and prevent contamination of the product through lubricant leakage; it needs them for protection against radial, thrust and combined loads and misalignment of moving parts.

Nothing builds and sustains morale—civilian and military—like an adequate food supply. A well-fed person is an optimistic person, an energetic person, a courageous person. Hence, the proper preparation and preservation of food and its conservation are vital to Victory.

Timken Bearings help to make food factories more efficient by speeding up the various processes, saving time and preventing waste. The more there are in any piece of equipment the better it will perform, the longer it will last and the less it will cost for operation and maintenance. The Timken Roller Bearing Company, Canton, Ohio.

Put your money into the fight by buying more and more War Bonds. There is no better investment.

"All There Is **TIMKEN** *In Bearings"*

TRADE-MARK REG. U. S. PAT. OFF.

TAPERED ROLLER BEARINGS

Century open protected squirrel cage motor. Now available from 2 to 15 horsepower.

15 horsepower, splash proof, squirrel cage, induction motor. For installations requiring protection from falling objects or plant wash-downs.

5 horsepower, totally enclosed, fan cooled, squirrel cage motor. For installations requiring protection from dirt, or explosive grain dust.

15 horsepower, explosion proof, squirrel cage, induction motor. For installations requiring protection from Class 1 Group D gases.

CENTURY Offers You CORRECT MOTOR PROTECTION For Every Type of Application

● Whatever the conditions under which the motor must operate, whether for indoor or outdoor installations, there is a Century Motor designed and engineered to provide proper motor protection against all types of surrounding atmospheres.

Century Open Protected General Purpose Motors are designed and engineered to minimize the possibility of dripping water or solid objects entering vital motor parts. With standard insulations these motors also resist the action of mild acids and alkalies, normal moisture, and abrasive dusts. Century special insulations are available for higher concentrations of acids, alkalies, or steam.

Century Splash Proof Motors are engineered for use in motor applications exposed to frequent wash-downs with a hose. They are storm-proof for outdoor installations exposed to rain or snow. Special insulations are available for unusual acid or alkali-laden atmospheres.

Century Totally Enclosed Fan Cooled Motors are intended for applications in machine shops or other places where they are exposed to abnormal amounts of coolant fog or spray combined with dusts and it is necessary to protect the motor against such atmospheres.

Century Explosion Proof Motors are protected against explosive, dust-laden atmospheres or atmospheres containing many of the explosive gases. They carry Underwriters' label for Class II, Group G, and Class I, Group D hazards, respectively.

Your nearest Century Application and Service Engineer will gladly give you complete details. He's always at your service — call him in.

Century MOTORS

Help You Beat the Production Promise

CENTURY ELECTRIC CO.

1806 Pine Street St. Louis, Missouri

Offices and Stock Points in Principal Cities

305

One of the Largest EXCLUSIVE Motor and Generator Manufacturers in the World.

Painting an *SOS* on the ocean

Two shot-down fliers are floating in a rubber life raft.

They spot a U. S. plane. One grabs a small metal can . . . whips off the cap . . . dumps the contents into the water.

A giant splotch of yellowish-green color, hundreds of feet wide, spreads across the water. Even at 10,000 feet, the pilot in the searching plane sees this brilliant distress signal.

What is in this can? What magic stuff can paint an SOS like this on the ocean? It's an amazing chemical powder, standard equipment in the life rafts of our planes.

Nothing is left to chance in safeguarding American boys. That's why this mysterious powder is packed in cans. That's why countless other war materials—food, fuel, weapons—are protected by America's favorite container, the can.

Metal cans do not break, chip or tear. They protect against temperature changes . . . against insects, water, dirt, light. Things get there—*safe*—in cans.

Some day the cans of war will be back on your shelf. They'll be better than ever. We're piling up a lot of new knowledge and experience as one of the packaging headquarters for Uncle Sam.

TO MAKERS OF WAR GOODS

Metal containers are delivering the goods *safely*—foods, supplies, and bullets arrive ready for action. Continental is making millions of these cans along with other needs, including plane parts.

Yet, rushed as we are, we can still take on more! Right now, a part of our vast metal-working facilities for forming, stamping, machining and assembly is still available. Write or phone our War Products Council, 100 East 42nd Street, New York.

gets there-safe-in cans

CONTINENTAL CAN COMPANY

HELP CAN THE AXIS—BUY WAR BONDS

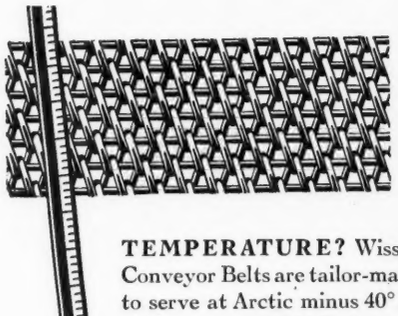
His chow . . . and those tough Shells

have one thing in common . . . they were speeded through production on Wissco Conveyor Belts.

These modern, flexible metal conveyor belts are licking conveyor "absenteeism" on such strenuous industrial jobs as hardening projectiles, annealing shell cases, brazing, all kinds of food processing, dehydrating, rubber reclaiming, and tin salvaging.

Each Wissco belt is custom-engineered and manufactured to meet the requirements of a specific job: high or low temperature, chemical punishment, abrasion, or other grueling attack. Into each is built 45 years of accumulated experience and pioneering.

Send for free book "Wissco Metal Conveyor Belts." Wickwire Spencer Steel Co., 500 Fifth Avenue, New York, or Buffalo, Chicago, Worcester, San Francisco.



TEMPERATURE? Wissco Conveyor Belts are tailor-made to serve at Arctic minus 40° F. *cold*, or up to 2100° F. *hot.*

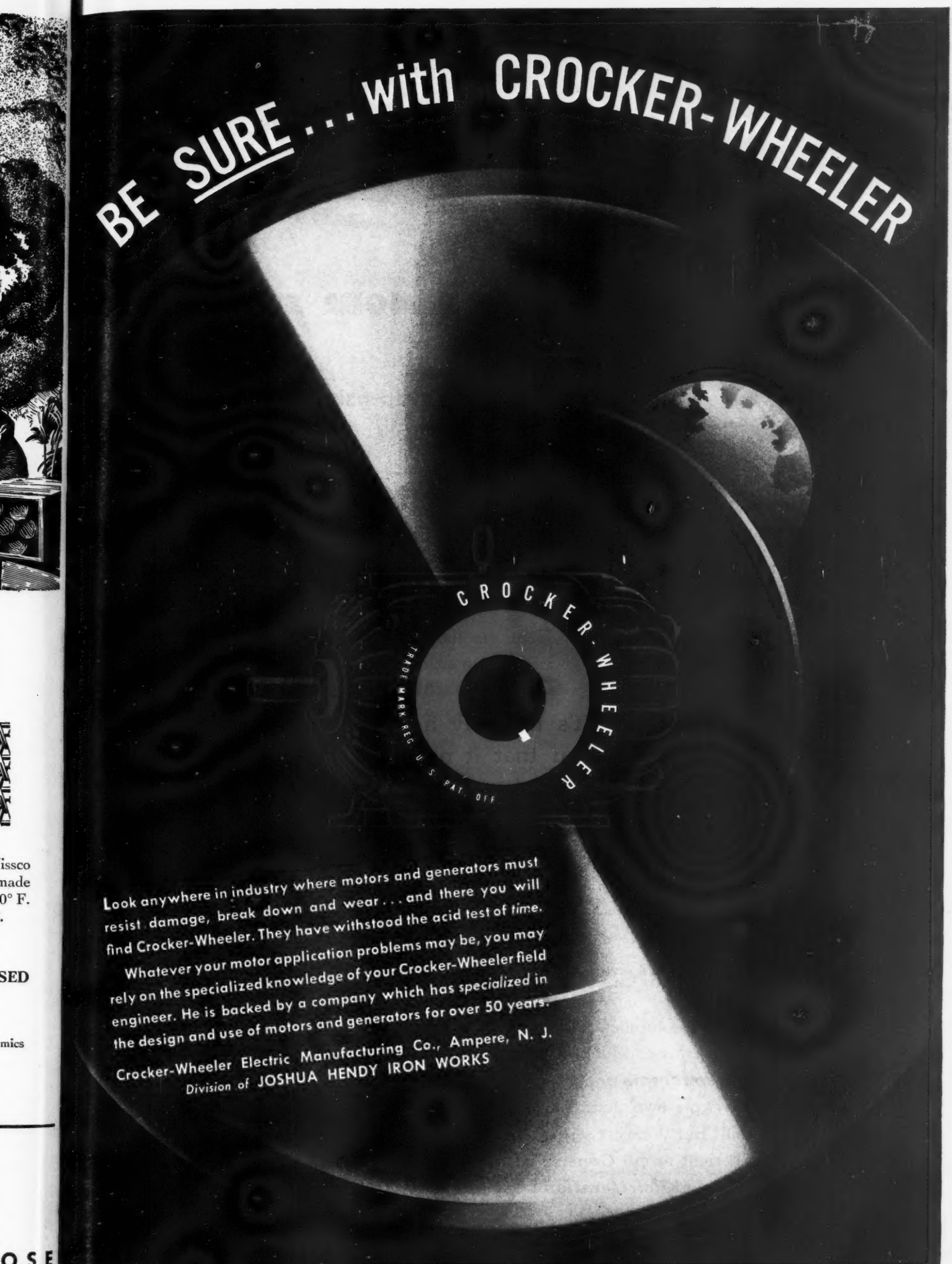
WHERE THEY ARE BEING USED

Annealing Ovens	Dehydrating Food
Hardening Furnaces	Canning Operations
Brazing Furnaces	Chemical Processing
Degreasing	Decorating Glass, Ceramics
Reclaiming Tin, Rubber, etc.	

★ WISSCO ★

CONVEYOR BELTS FOR EVERY PURPOSE

BE SURE . . . with CROCKER-WHEELER



Look anywhere in industry where motors and generators must resist damage, break down and wear . . . and there you will find Crocker-Wheeler. They have withstood the acid test of time.

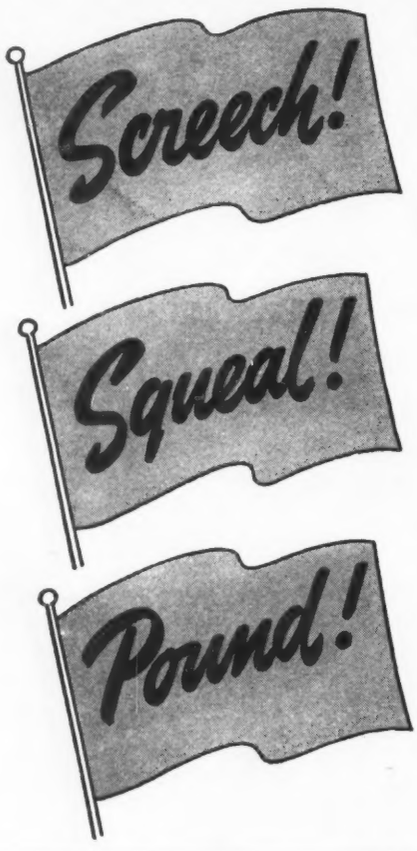
Whatever your motor application problems may be, you may rely on the specialized knowledge of your Crocker-Wheeler field engineer. He is backed by a company which has specialized in the design and use of motors and generators for over 50 years.

Crocker-Wheeler Electric Manufacturing Co., Ampere, N. J.
Division of JOSHUA HENDY IRON WORKS

Other JOSHUA HENDY IRON WORKS factories at Sunnyvale, Pomona and Torrance, California and St. Louis, Mo.

To owners of G-E Air Conditioning, G-E Commercial Refrigeration

DON'T WAIT FOR THESE DANGER SIGNALS!



It's the way a condensing unit demands attention when lubrication has been neglected!

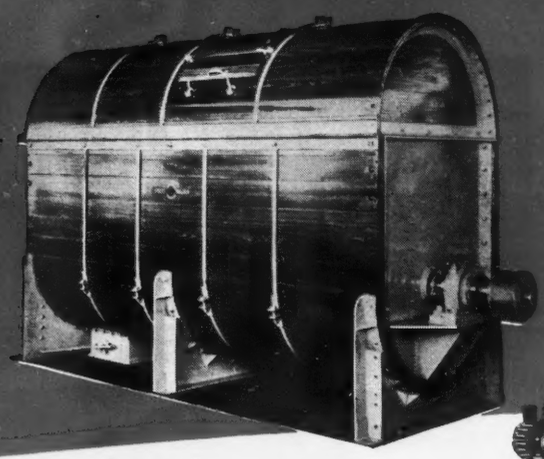
It's the way a condensing unit tries to inform you that its belt needs to be tightened.

It's the way a condensing unit warns you that it needs to be inspected by a competent service man.

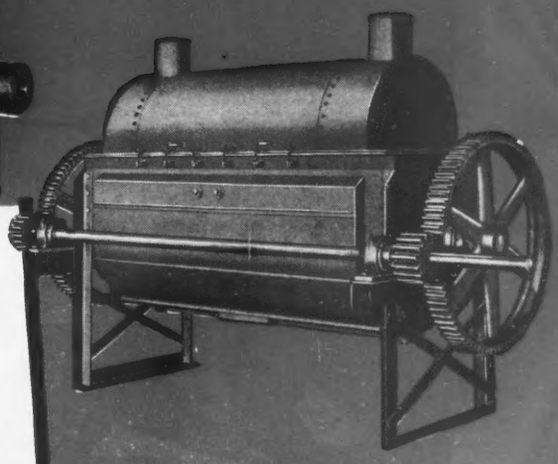
Proper maintenance pays big dividends!

Today, your G-E equipment is irreplaceable. And parts are not always easy to get. So it's tremendously important to treat your equipment right. *Keep it clean—Keep motors oiled—Keep belts adjusted.* Such simple jobs—easily done by your own maintenance man—may save you a barrel of trouble and a big bill! But if expert service is indicated, don't delay—call your G-E service man right away! *General Electric Company, Air Conditioning and Commercial Refrigeration Dept., Division 3894, Bloomfield, N.J.*

GENERAL ELECTRIC



Horizontal batch-type mixer with wood body used in manufacture of yeast.



Special jacketed mixer with vented dome cover, built for a nationally-known food products plant.

THE VARIETY AND VERSATILITY OF SPROUT, WALDRON MIXERS help process old foods in new forms

★

THE remarkable changes which our foods are undergoing to save space, retain nutritive values and flavors, emphasize the part which SPROUT, WALDRON Mixers and other processing machines can play in the speedy and economical preparation of dehydrated, granulated and compressed foods in a market where shipping space is at a premium.

The wide range of mixers includes standard batch and continuous types in both vertical and horizontal models, and literally hundreds of others, custom built to meet the requirements of special processes—often combining several steps, like sifting, grading or blending, with mixing.

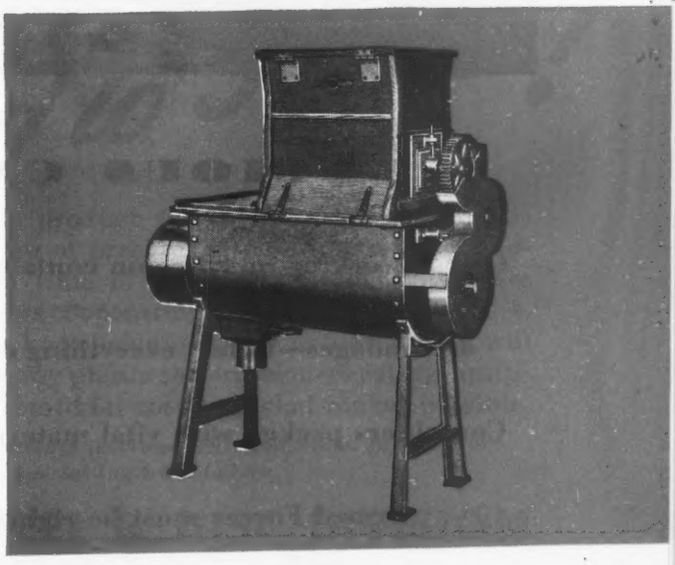
Other SPROUT, WALDRON equipment used by food processors includes rotary knife cutters, crushers, shredders, grinders, attrition mills, dust collectors, conveyors and elevators.

When you bring your problem to SPROUT, WALDRON you will get, besides 77 years of experience, the benefit of a versatile, ingenious engineering staff that will study it from all aspects so that preparative and sequential steps may be combined for synchronized production.

Write for Bulletin 1234—a compact description of SPROUT, WALDRON Process Equipment.

★

One of several types of standard sifting mixers.



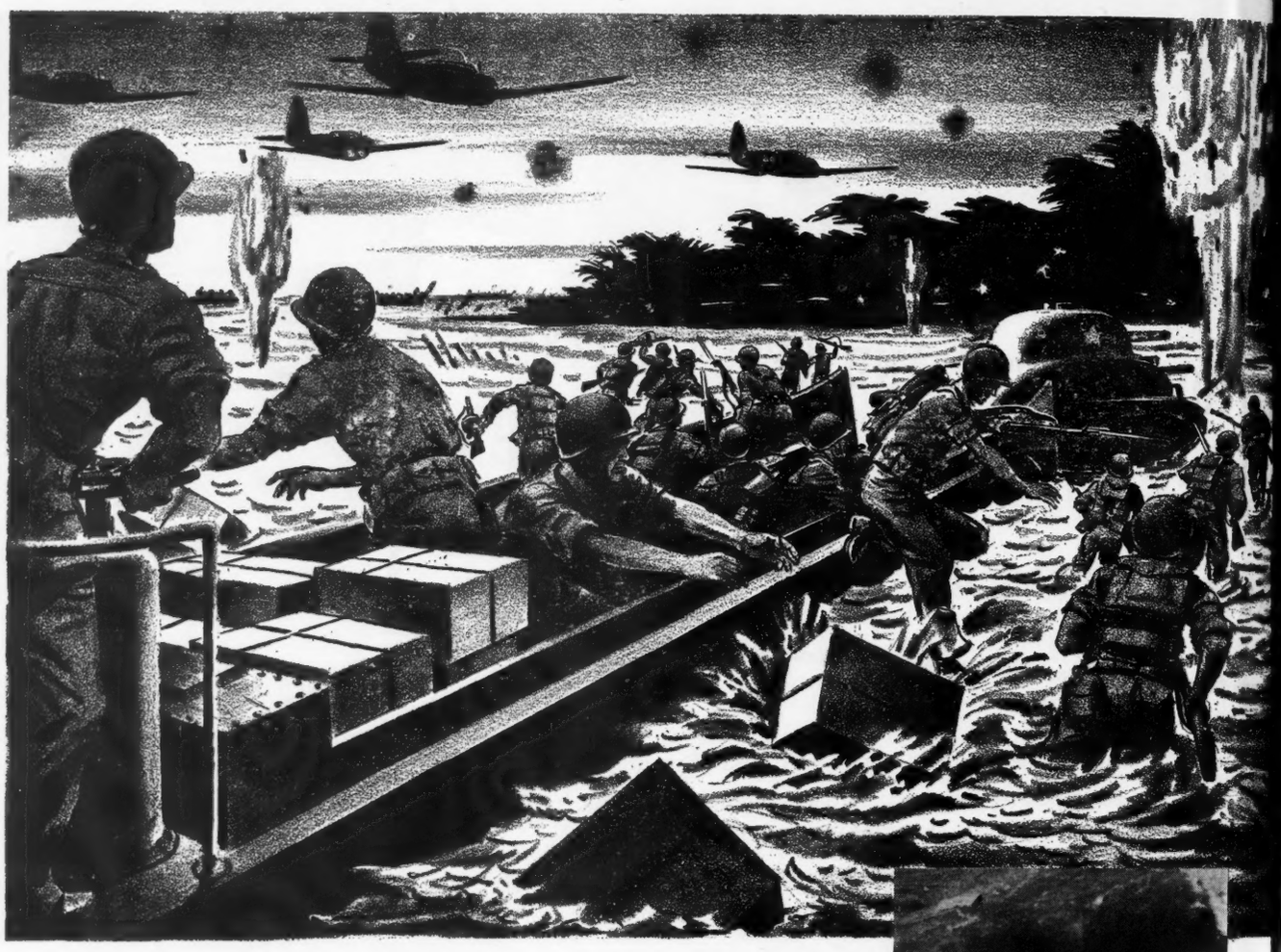
SW

SPROUT, WALDRON & COMPANY

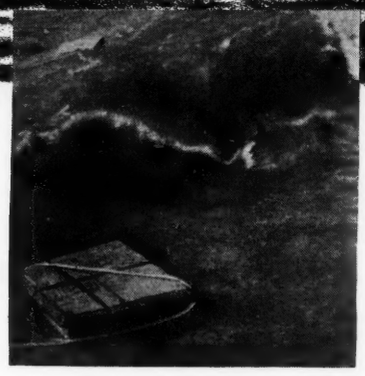
Manufacturing Engineers since 1866

144 SHERMAN STREET MUNCY, PENNSYLVANIA

GAIR BOXES DELIVER



PRECIOUS CARGOES



Gair is working *overtime* on containers for bullets, beans, or bandages—in fact everything essential to win a war.

Containers packed with vital materials for the Armed Forces must be right... Gair makes them so that they will arrive at their secret destination—

***WHOLE—DRY—PERFECT*—and ready for actio**

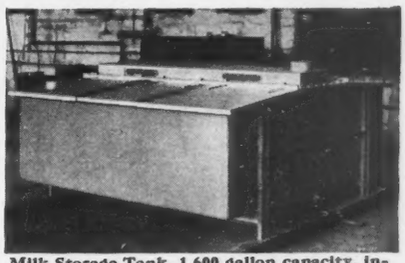
Write for booklet *showing photographic records of ocean submersion tests made by Gair to meet U. S. Quartermaster Specification No. OQMG-93, Navy Specification 53B11, Lend-Lease Specification FSC-1742-B and FXS-511.*

Robert Gair Company, Inc., New York—Toron

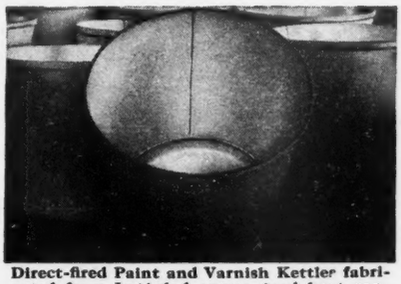
FOLDING CARTONS · BOXBOARDS · FIBRE & CORRUGATED SHIPPING CONTAINE

Cereal Cookers fabricated from IngAclad

Golden corn syrup is protected in color and flavor by having tanks lined with IngAclad SHEETS.

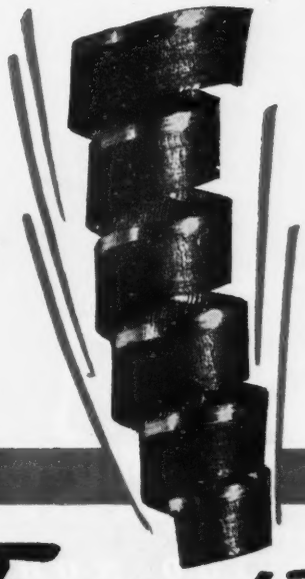


Milk Storage Tank, 1,600 gallon capacity, installed for the Libby, McNeill & Libby plant, at Patterson, Calif.



Direct-fired Paint and Varnish Kettler fabricated from IngAclad assure good heat conductivity and freedom from discoloration.

Unretouched photo showing machine turning from IngAclad Stainless-Clad Plate.



Stainless Vacuum Steaming Tank nearly 24 ft. long by 8 ft. in diameter. IngAclad made possible large savings in material cost.

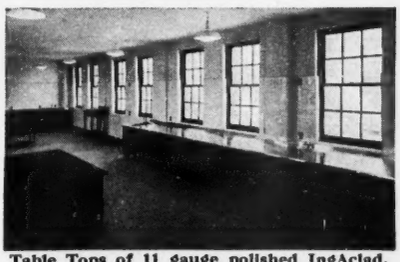
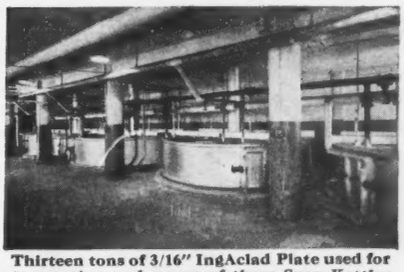


Table Tops of 11 gauge polished IngAclad, used by Testing Laboratory, U. S. Department of Agriculture.



Thirteen tons of 3/16" IngAclad Plate used for top section and covers of these Soap Kettles installed in a Canadian plant.

To SERVE and to SAVE!

To those holding high-rated war orders, IngAclad is available in Sheets 18 to 8 gauge, and in Plate form. Regularly supplied clad with 18-8 Stainless, but also available in other analyses.

We also produce Ingersoll Solid Stainless and Heat-Resisting Alloys. Send us your inquiries.

Designed as a peacetime product for *serving* the Process Industries and for the *saving* of precious alloys, IngAclad has become even more vital in time of War. New applications have been found by our Engineers cooperating with the Armed Services. When Peace is won, the knowledge of these achievements will speed the conversion of many plants to corrosion-resisting equipment through the lower material cost IngAclad makes possible.

Plan now for plant and product improvement tomorrow. Investigate IngAclad today. Write for special IngAclad Folder.

INGERSOLL STEEL & DISC DIVISION
BORG-WARNER CORPORATION
310 South Michigan Avenue, Chicago, Illinois
Plants: Chicago, Illinois; New Castle, Indiana; Kalamazoo, Michigan

"A Borg-Warner Product"

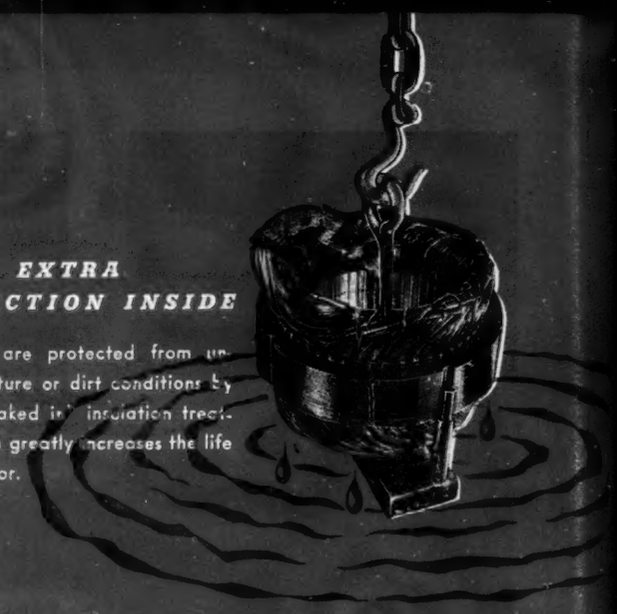
INGACLAD
STAINLESS-CLAD STEEL

EXTRA PROTECTION OUTSIDE

The cast iron frame and end shields are so constructed that the internal working parts of the motor are fully protected from falling dirt or dripping liquids.

EXTRA PROTECTION INSIDE

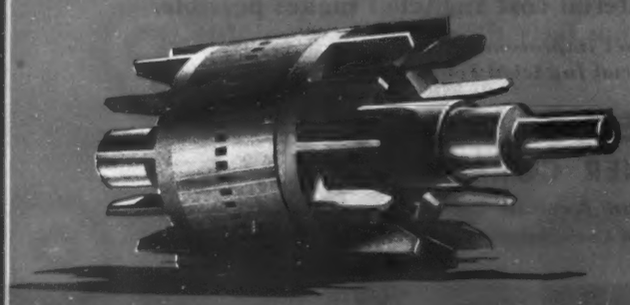
Windings are protected from unusual moisture or dirt conditions by special "baked in" insulation treatment which greatly increases the life of the motor.



MASTER ELECTRIC MOTORS

1/10 TO 100 HORSEPOWER

THE MASTER ELECTRIC COMPANY • DAYTON, OHIO

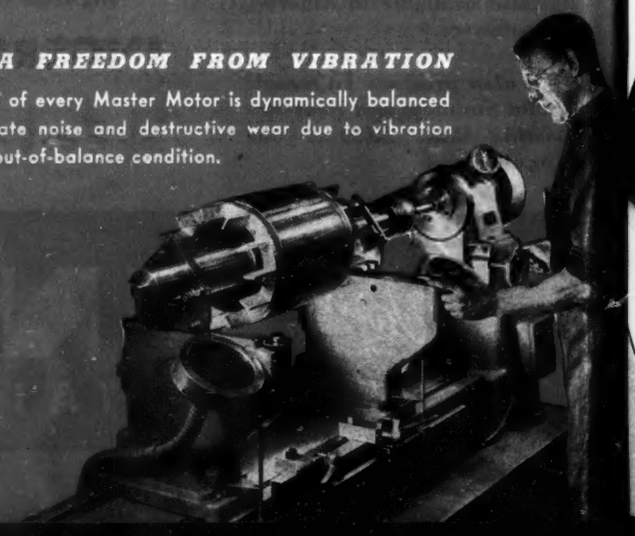


EXTRA RUGGED CONSTRUCTION

Unusually heavy alloy steel shafts and oversize bearings add greatly to the durability of Master Motors. In Squirrel Cage motors the rotor windings are cast integral with the rotor laminations.

EXTRA FREEDOM FROM VIBRATION

The rotor of every Master Motor is dynamically balanced to eliminate noise and destructive wear due to vibration from an out-of-balance condition.



Perhaps We Can Help YOU, Too!

American ingenuity is helping to solve many of the packaging problems created by wartime restrictions and regulations. New materials, new methods, new processes are being developed constantly to facilitate continued distribution of nationally-known products.

More than that, careful planning and designing make it possible for the new wartime package to retain familiar recognition features . . . such as brand name, trade-mark and quality appeal *in their established colors* . . . even though the style or shape of the package has been changed.

Retaining brand identity is important. Your reputation for high quality will soon be forgotten . . . your goodwill and prestige will be sacrificed . . . if your established brand identity is discarded, even temporarily.

If you are confronted with a packaging change-over . . . if you are wondering how you can still market your product in familiar dress, call on Stecher-Traung.

As one of the world's largest producers of packaging materials, we invite you to take advantage of our many services. And, as leaders in the field of Full Color Lithography, we offer you the benefits of experience, skill and ability to produce quality packaging materials in sparkling full color, at surprisingly modest cost. Write us today.

For over 75 years—headquarters for high-quality, colorful, lithographed labels, box wraps, packets, folding boxes, cartons, merchandise cards and envelopes, displays and advertising materials.

FREE!
Our 28-page book —"The Value and Patriotic Use of Full Color" tells how to get beautiful results at low cost. Write today for your *free* copy.

Contractors to the Government—War Work Comes First!

STECHER-TRAUNG
LITHOGRAPH CORPORATION

Rochester, N. Y. **San Francisco, Calif.**

Offices in Principal Cities

You can beat the moisture-vapor trick!

A few package sizes for many products and weights. These Dulany cartons, made by Container Corporation, make good use of an easily varied outer wrap.

Now you see it — now you don't! The tricks of moisture vapor loss have caused too many headaches in quick-freezing packages.

Container Corporation has developed a number of sure-fire ways to beat it — based on selecting the *one correct package* for the particular product, freezing method, and distribution factors.

Our frozen foods staff has grown up with the industry — they can help you with both the technical and practical aspects of your product and its packaging. Call or write our nearest office and arrange a consultation.

CONTAINER CORPORATION OF AMERICA

Chicago • New York • Rochester • Natick, Mass. • Philadelphia • Akron • Cincinnati • Cleveland • Circleville • Detroit • Indianapolis
Wabash • Carthage • Anderson, Ind. • Peoria • Rock Island • Minneapolis • Baltimore • St. Louis • Fernandina • Dallas • Ft. Worth

EVERYTHING PAPERBOARD FOR EVERYTHING PACKED

FOLDING CARTONS • BOXBOARDS • CORRUGATED AND SOLID-FIBRE SHIPPING CASES

THIS IS SERVICE!

Carrier Tells You How To Keep Your Equipment at Peak Operating Efficiency for the Duration

To help you enjoy the continued benefits of your air conditioning, refrigeration and heating system Carrier has prepared a 5-Point Service Plan.

Today, in the face of increasing shortages of such equipment, replacement parts and trained service men, this check list is a timely guide to insure peak operating performance.

You will find your Carrier distributor or representative ready to give you expert service whenever it is needed and to cooperate with you in every way to help you keep your equipment operating efficiently and economically.

CARRIER CORPORATION, SYRACUSE, N. Y.

5-Point Service Program

1. Make Maintenance of Equipment the Responsibility of a Capable Employee.
2. Make Regular Monthly Inspection of all Equipment. See that it is Properly Lubricated.
3. Keep Equipment Free of Dust and Dirt and Check Frequently for Refrigerant Leaks.
4. Follow Operating Instructions Furnished with Each Type of Equipment.
5. Have Nearest Carrier Distributor Inspect Installation to Insure Satisfactory Operation and Avoid Expensive Repairs.

Carrier

AIR CONDITIONING • REFRIGERATION

ARMY E NAVY

CARRIER CORPORATION
Desk 19-D
Syracuse, N. Y.

Please send free copy of booklet: "Civilian Conservation of the B. T. U." telling how to keep air conditioning and refrigeration equipment operating for the duration.

Name.....

Company.....

Address.....City.....

INSIDE NEWS

APRIL PREPARED BY NATIONAL CAN CORPORATION, NEW YORK, N. Y. 1943

Glycerine in A.R.P. Glass Protection

Lessons Learned from Bombing of London Prove Helpful to American Investigators

RUIN IN OXFORD STREET AFTER "BLITZ" RAID—These hollow-eyed buildings, with scarcely a pane of glass remaining in their gaunt window frames, graphically illustrate the need for reinforcing plate glass against the concussion of high explosive bombs.

Much of the pertinent information concerning the treatment of glass to protect people from flying splinters and jagged fragments during air-raids has been obtained from the bitter experiences of the much-bombed British. Among the several procedures recommended by the Ministry of Home Security, A.R.P. Department, is the employment of thick, tough or reinforced paper applied to the glass with flour paste or acacia mucilage made slightly tacky by the addition of 5 per cent of glycerine. Uncoated transparent wrapping materials (except cellulose acetate film) can also be used. These are applied to the windows by means of a good clear gum to which 15 per cent of glycerine has been added.

Investigations have also been carried out by American investigators. Recently, one of them developed a new and very effective procedure for protection against flying glass. According to his method, old bed-sheets are cut into one-inch strips which are freely daubed, by means of a paint brush, with the following composition:

Wheat flour	4 oz. av.
Powdered alum	4 drams
Sodium benzoate	20 grains
Oil of cloves	30 drops
Glycerine	4 fl. oz.
Water	2 pints

The flour and alum are rubbed to a smooth paste with the water and the glycerine. The mixture is then heated quickly to the boiling point, removed from the source of heat, and then thoroughly mixed in the remaining two ingredients.

It is advisable to apply the strips to windows in criss-cross fashion, placing them about 1-½ inches apart and permitting the ends to overlap the edge of the window frame. (314)

To Locate Fish By Sound

Fishermen in British Columbia waters may soon seek their fish by sound. This method of locating large schools of fish has proved effective in Norwegian waters and is to be tried out in the herring fishing industry of British Columbia. A fish canning company is fitting a 45-ft. boat with an echo sounding device at a cost of $4,000 to $5,000.

Originally devised to aid ships in shallow waters, this echo sounder has been improved until it will record a whisper, and it is used in detecting the presence of submarines in wartime. As used by fishermen, the device will locate a large mass, or school, of fish by the sound reflected from the body of fish, and the distance to the catch will be indicated by a meter. (336)

Progress Reported in Guayule Rubber Project

Progress in the expansion of the guayule rubber production program under the several cooperating agencies of the U. S. Department of Agriculture has exceeded early expectations. Recent developments by the Department's Emergency Rubber Project are in accord with the findings of the Baruch committee which recommended "that this program be given every possible support as the principal source of crude rubber which could not be lost to us short of conquest of American territory."

The Forest Service, which is administering the production phases of this emergency program, will start to mill in mid-January the older shrubs previously reserved for seed collection.

This winter the Forest Service factory will manufacture 600 tons—only a fraction of the nation's needs—but the first natural rubber produced in the United States since the beginning of the war. Plantations being established this winter are expected to yield about 21,000 tons from the harvest starting late in 1944. The planting and harvesting schedule is planned to produce about 80,000 tons annually thereafter. Even the maximum production mentioned, however, is small in comparison with the country's normal peacetime consumption of 700,000 tons of rubber a year. (315)

Boost for Canned Milk

When properly prepared, canned and dried milk retain the full nutritional value of the fresh milk, it is revealed by studies in Switzerland. This is especially true of the sweetened products. Even vitamin C, in spite of its sensitivity, is retained by the best modern methods. Furthermore, uniform composition, freedom from pathogenic organisms and fine casein dispersion make canned and dried milk products more digestible than fresh milk. (316)

"Utility" Paint Proposal Renewed in Britain

Since domestic paints have become almost unobtainable in Britain, discussions on the advisability of producing a limited amount of a "utility" paint are again in progress between the Board of Trade and the Paint Federation. A recent statement in the House of Commons revealed that a provisional arrangement has been made for a supply of linseed oil for such paint, and steps are being taken for the release of certain quantities of other necessary raw materials. The British paint trade believes that the "utility" paint, when eventually produced, will be made in three or four shades. (317)

NATIONAL CAN

PLANTS: NEW YORK • BOSTON • BALTIMORE • CHICAGO • HAMILTON, OHIO • FORT WAYNE, INDIANA

An Oasis in the Desert

A 2½-gallon water canteen produced by National Can for our armed forces.

Brine Preservation of Vegetables

Because of the shortage of containers, experiments are being conducted, with indications of success, in the brine preservation of snap beans, peas, lima beans and other vegetables. The process, similar to that employed in brine curing of pickles, has been under study at North Carolina Agricultural Experiment Station for several months. The research is conducted cooperatively by the experiment station and the U. S. Department of Agriculture.

If successful, the brine preservation of vegetables would help to build up food supplies to meet wartime needs of the United Nations and would save those portions of the crop generally lost through seasonal overproduction. (318)

Lactic-Acid Lacquers

Efforts to devise lacquer substitutes for tin containers, through the use of lactic acid obtained from the whey that is a by-product in cheese and casein factories, are making progress. In experimental coating of steel milk cans this lacquer has proved highly successful, also in coating evaporated milk cans. Previously dairy scientists had developed lacquers suitable for coating wood, paper, glass and other substances. Some of these lactic-acid lacquers doubtless will be useful to various branches of the canned food industry. (319)

* * *

Approximately one-sixth of all gasoline consumed in the U. S., 5,000,000,000 gallons, goes to farmers. They also use large quantities of lubricating oils and greases, estimated at 138,000,000 gallons and 2,000,000 pounds respectivelv.

Technical Topics

INSECTICIDES—The effectiveness of attractants and repellents for insects and animals can be increased substantially by the incorporation into the formulas of minute quantities of glandular extracts of animals such as the skunk, the muskrat, etc. Musk odor serves as a particularly powerful lure in insect attractants. (320)

SURGERY—A British publication reports that wire of corrosion-resistant alloy steel is being used by Swedish surgeons in place of silk or catgut. (321)

CAROTENE DETERMINATION in plant tissue by a rapid chromatographic method was described recently in a project completed in the Eastern Regional Research Laboratory of the Department of Agriculture. The method can be used for both fresh and dehydrated materials. (322)

POTASSIUM CARBONATE is now being produced in Germany from a mixture of potassium sulphate, lime and coke. The sulphate and lime are reacted at elevated temperatures in the first step of the process, to produce a concentrated solution of potassium formate containing calcium sulphate in suspension. The liquor is then evaporated to dryness and the residue calcined in a surplus of air. (323)

ROSINATED CALCIUM LAKES are improved in tinctorial properties, mass-tone, and strength by the addition of small amounts of sulphuric acid esters of the higher fatty acids during processing, it is claimed in a recent British patent. (324)

TETRAETHYLTHIURAM MONOSULPHIDE has been found an effective agent for the treatment of scabies in Britain. (325)

LINSEED OIL — Lend-Lease has been shipping large quantities of linseed oil to Russia to be used principally as food. The hydrogenation of such oils to harden them is entirely feasible, and experiments have disclosed that an excellent shortening can be made from oil either wholly or partly linseed. (326)

NEW FOOD SHORTENING—By a recently developed process, tasteless and odorless shortening with a vitamin content is made by hydrogenating fish oils, adding them to vegetable oil and treating further by hydrogenation. (327)

PEELER — Developed for a marmalade manufacturer, a lathe-like peeler has been patented which removes from citrus fruit the outer surface of the peel containing the bitter cells. (328)

MEAT PRESERVATION—To inhibit deterioration in meat products, a method has been developed for subjecting the meat to inert gas under greater than atmospheric pressure. (329)

VEGETABLE DISCOLORATION — Discoloration of the cut surfaces of fruits and vegetables can be prevented by dipping the pieces in dilute thiosulphate solutions. The method has recently been patented. (330)

SYNTHETIC RESIN IDENTIFICATION by means of schematic flame and olfactory tests was described recently. (331)

BISMUTH SUBSALICYLATE has been found effective for combatting blue mold or downy mildew disease in tobacco. (332)

LIVER can be dried and reduced to a fine brown powder by a recently developed process. When so processed, it is said that it can be preserved indefinitely without refrigeration and occupies only about one-fifth the normally required space. (333)

TARTAR EMETIC SPRAY RESIDUES on citrus plant materials may be rapidly determined by a recently developed analytical method based on iodometric titration. The iodometric procedure eliminates the necessity of ashing the leaf materials, as was done in the modified Gutzeit method formerly employed for determining the antimony content of the tartar emetic. (334)

CHROME YELLOW, with a solubility of only 1.75 percent, for use as a pigment in paints, inks and other materials is now being offered by an American company. The new pigment is especially intended for use in camouflage coatings, since the low solubility reduces the possibility of lead being assimilated to a dangerous degree during the spray-painting of war materials. (335)

Every effort will be made to furnish additional information on these articles. Where such information is not obtainable, we will refer inquiries to the original source of the article. Write to National Can Corp., 110 E. 42nd Street, New York City. Please mention the number at end of article—also name of the magazine you saw it in.

(Advertisement)

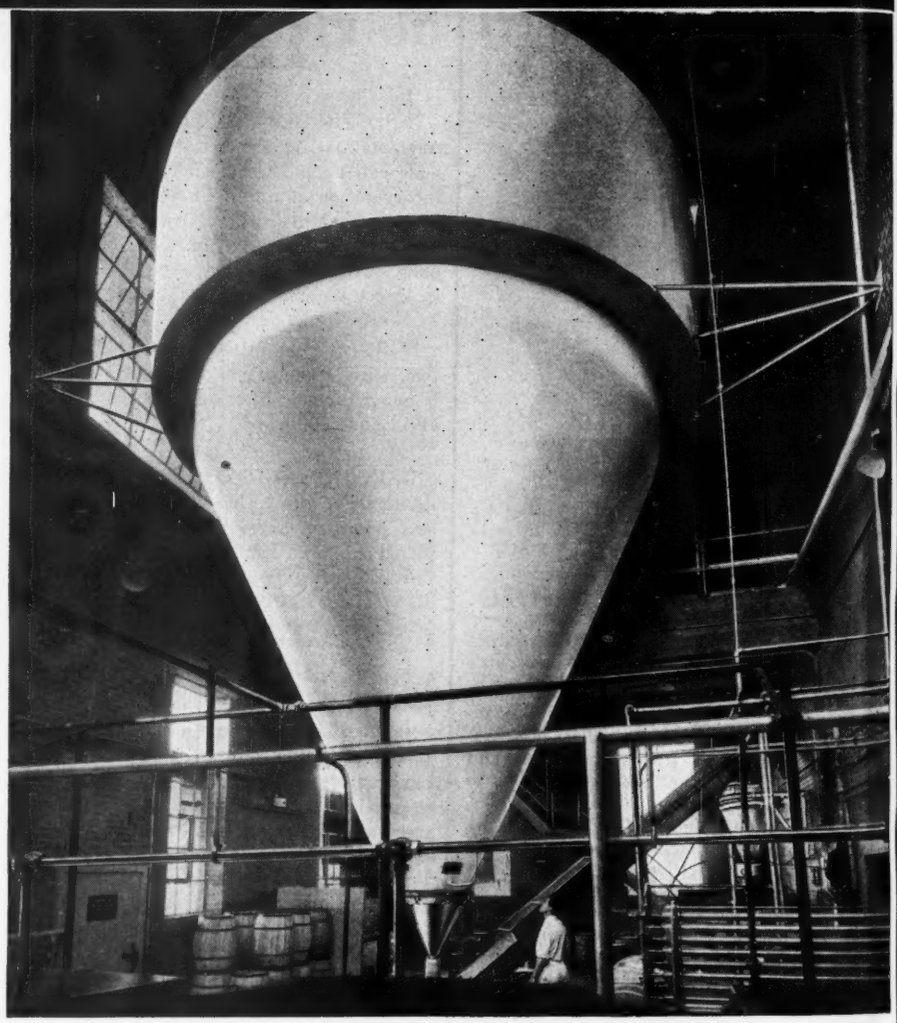
Douthitt Designed Equipment
For Flexible and Exacting Food Dehydration

Produce natural flavor dehydrated foods— with vitamins retained

The **GRAY-JENSEN SPRAY PROCESS DRYING PLANT**

—for our Armed Forces, Allies and Domestic Use

The demand at home and abroad for dried milk, dried egg and other dehydrated food products is steadily increasing. It is big business now . . . and will be for years to come. Feeding the world will continue to be Uncle Sam's job long after victory has been won.



A Gray-Jensen Spray Process Drying Plant, designed and installed complete by Douthitt engineers for you, is your logical and profitable answer to this growing need.

Gray-Jensen Plants are designed for the spray drying of egg and all other food and chemical products that can be reduced to liquid form and handled with pumps. Increased earnings for you are assured through important fuel and labor economies resulting in the lowest manufacturing cost per pound of powder. Can be operated 22 hours a day. Details on request. INVESTIGATE NOW!

*Solubility * Full Recovery of Solids * Flavor Goodness * Keeping Quality * Economical Operation*

The **DOUTHITT CORPORATION**
CHICAGO, ILLINOIS

Bemis Multiwall Paper Bags

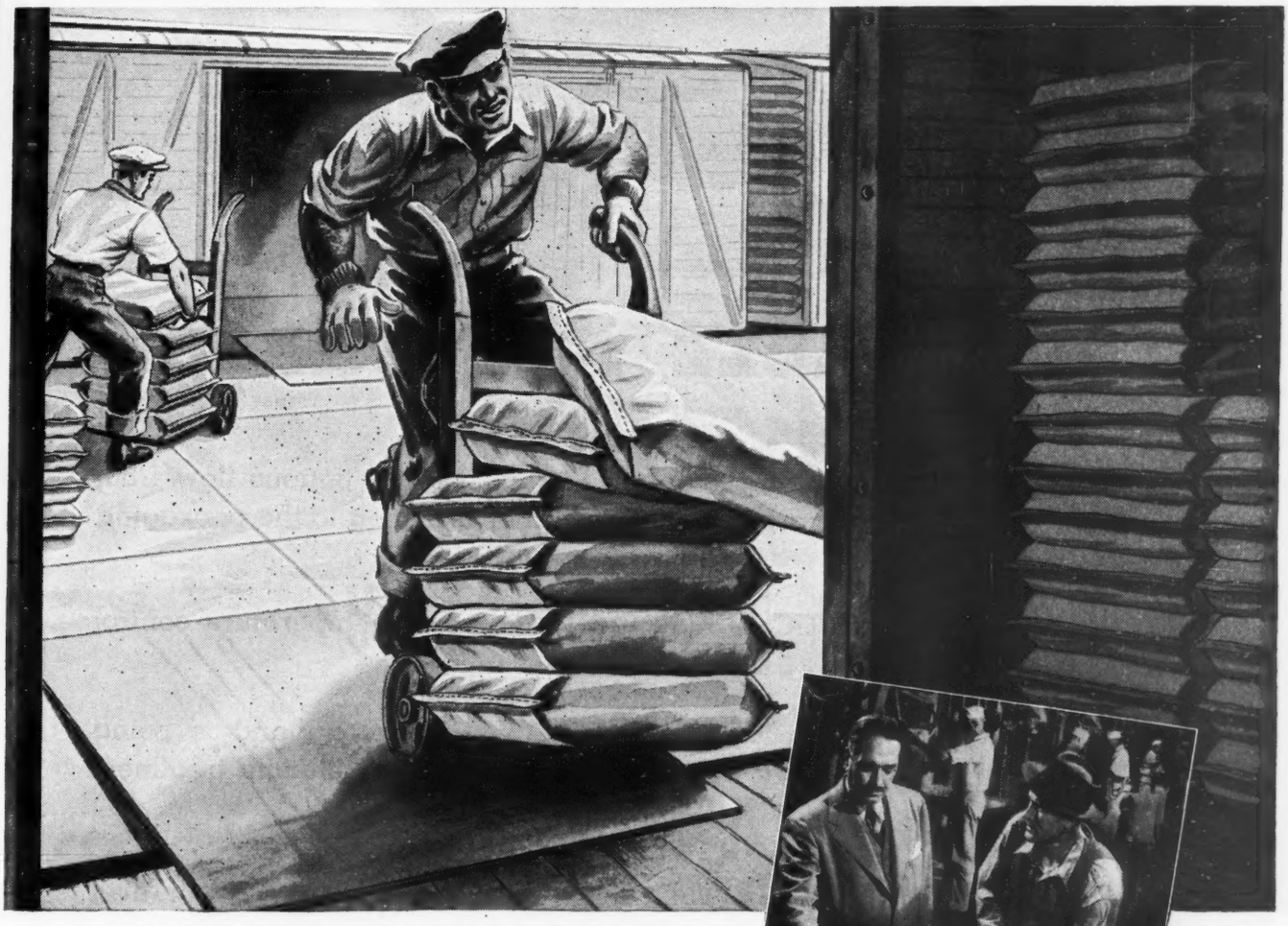
ARE HIGH IN STRENGTH . . . LOW IN COST

If you're looking for immediate delivery of low-cost shipping bags with extra strength to deliver your product safely to the job, let us hear from you.

Bemis Multiwall Bags have what it takes in your industry. They reduce shipping and handling damage because Bemis specifications for paper strength exceed, not just equal, Consolidated Freight Classification requirements. This extra strength keeps your production line moving, too, by reducing breakage.

Bemis Multiwall Paper Bag factories are located strategically to give you quick service. On unusually large orders or in an emergency more than one plant will go into production for you if necessary.

Why not talk over your multiwall bag needs with us? Let us show you what we honestly believe is the best multiwall bag built. Let us prove that Bemis service is unexcelled.



Today, with freight cars and trucks loaded to capacity, with handling faster, rougher, harder on containers, the extra strength of Bemis Multiwall Bags is more important than ever.

IT PAYS TO TALK TO THE BEMIS MULTIWALL PAPER BAG EXPERT

Whether your problem is one of bags, packing methods or machines, storage or shipping, the counsel of Bemis experts is yours for the asking. Often these men show bag users how to increase production and cut costs in the packing room.

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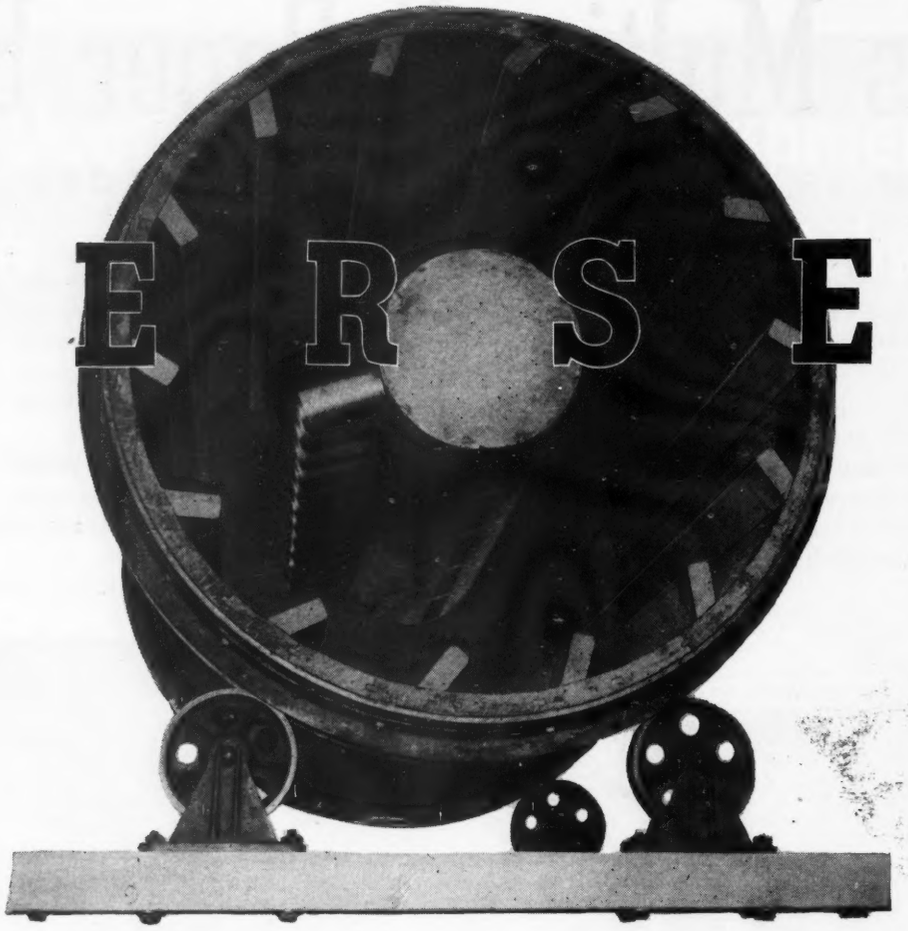

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THAT IS

CONTINUOUS IN OPERATION taking the product in continuous flow from the last washer and discharging without further attention to the packaging room

COMPLETELY AUTOMATIC in movement of product, temperature control and cycle time **NO OPERATORS NEEDED**

UNIFORM TREATMENT because the product is in motion and is being turned over constantly every particle receives exactly the same treatment

CONSTRUCTED OF

NON-STRATEGIC MATERIALS such as wood, cast iron, etc., wherever possible

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Glass packaged foods really sell fast. Now there is more reason than ever to pack in glass . . . Uncle Sam has requested it. The new Foster ★ Forbes standard line of jars have smaller closures to save much needed metal . . . are lighter in weight to conserve glass and minimize shipping costs . . . are made in a range of sizes ideal for salad dressings, nut butters, preserves, pickles, fruits, vegetables, etc. If you are going to pack in glass . . . jars or bottles . . . get in touch with us for samples and prices.

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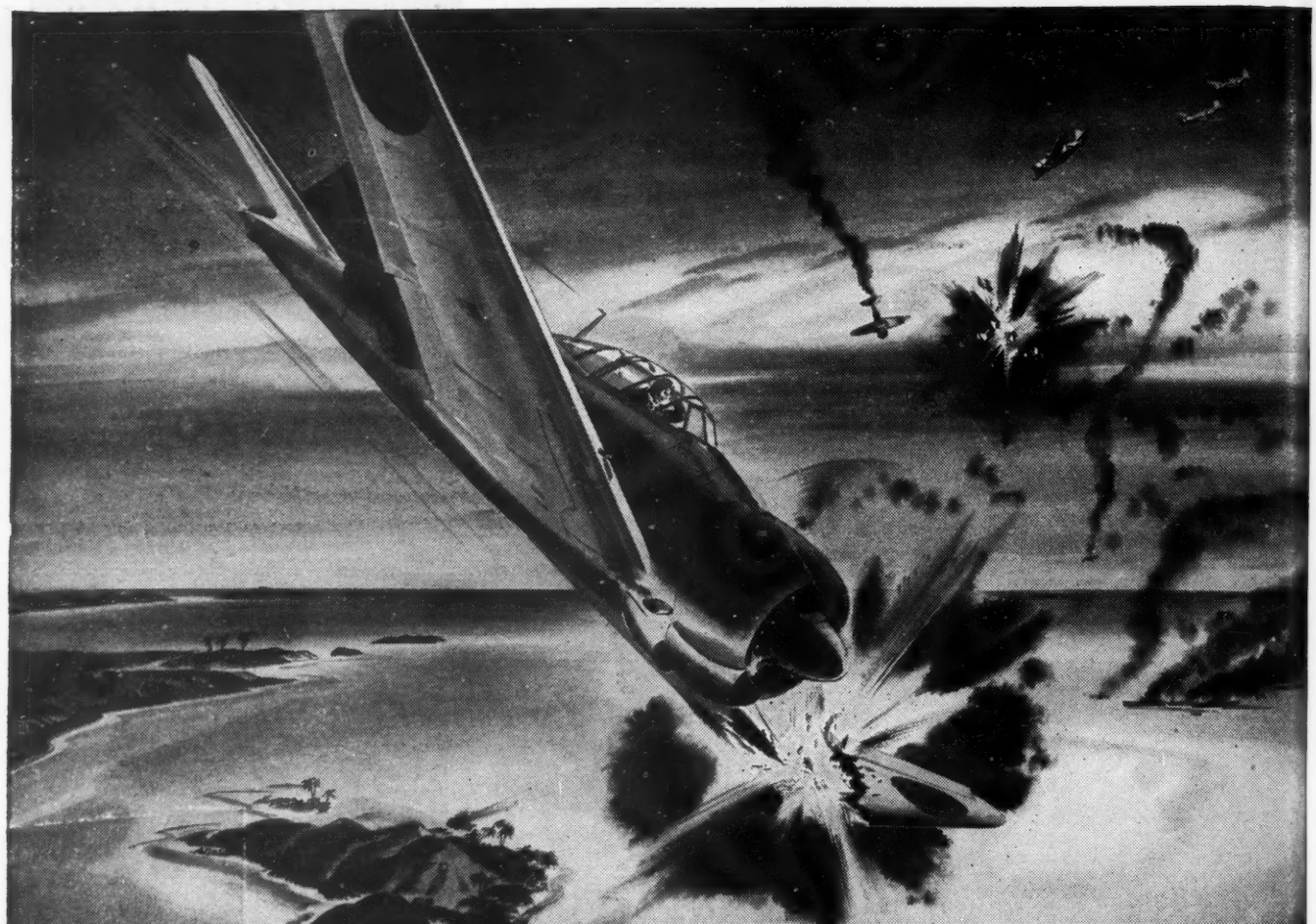


Part of that black puff is us

A LOT OF SHELLS that scream up toward Jap bombers and fighters are set to explode at certain altitudes. To explode . . . they require fuses.

The fuses require protective containers and Canco makes them.

Yet fuse containers are only one of many implements of war fashioned by Canco men and women with the sure speed and skill they used for the packaging industry in peacetime.

The number is in the millions

Canco is making complete torpedoes... from outer casing, propeller and fins... to the delicate and intricate interior mechanism. Other items include shell containers, demolition kits, hand grenades, land mines, field ration cans, parachute flare cases, T.N.T. containers and many others. The number of units is in the millions.

Canco Machine Shops are also at war

In addition to adapting container manufacturing equipment to war use, Canco Machine Shops are devoting more than 80 per cent of their production capacity to war work. They build that basic need for *all* production: machine tools.

The above uses of metal are some of the reasons why certain containers are no longer available for many consumer products. True, we of American Can Company still are making cans for the most *essential* civilian items; and we also are doing everything possible to develop substitute containers.

But with Canco—as with every other patriotic American manufacturer—the fighting forces must come first.

MANPOWER IS WARPOWER
Accidents must be prevented!
Co-operate with the War Production Fund to Conserve Manpower by warning your employees not to take chances.

☆ ☆ **AMERICAN CAN COMPANY** ☆ ☆
230 PARK AVENUE, NEW YORK, N. Y.

Food—The Deciding Issue

Our food problem remains to be solved

THE first thing the Germans did when they occupied Czecho-Slovakia, Poland, Belgium, France—was to empty all warehouses. Everything went into trucks headed for Germany.

The Nazis knew that this war would be won by the army that had the most supplies and the best supply system.

The Nazis knew that supplies are as essential as guns. They knew that the most essential of all supplies is... food.

Being the only people on earth who can watch women and children starve, the Nazis seized upon food as their most powerful instrument for disciplining the masses. They added famine to their arsenal of conquest.

The flocks and herds of Europe are being consumed with alarming rapidity. The desperate shortage of meats and fats is growing steadily worse. Our Allies are short of certain foods that we must supply if we expect them to carry on.

And as we supply them, as our imports are curtailed, as our fighting men consume more than they do in civil life, and as we fail to increase our production rapidly enough . . . we, too, become short of certain foods.

Former President Herbert Hoover, speaking before a conference of the Governors and Representatives of twelve Mid-Western farming states in Des Moines on March 15th, sounded the warning that American agriculture, beset by Washington bungling on manpower, farm machinery and price systems, strangling production and distribution, is facing a deterioration which may bring on a national food shortage such as led to the collapse of Russia, the defeat of Germany in the first World War and the fall of France in the present war. Unless this deterioration is stopped, warns Mr. Hoover, we cannot hope to win the present conflict.

Complications of similar magnitude face the food processor and the distributor.

Never in the history of the world has man's dependence on food been so crucial. Yet it is not easy for us to grasp the full significance of the crisis. We are so accustomed to finding milk, eggs and butter on our doorsteps every morning, we are so used to filling our pantries from the shelves of our grocers and markets that we accept food as something that is due us on demand. We do not stop to think that we never are more than a few meals ahead of famine.

But this picture has changed. Now we are faced with food rationing, and every day the shelves of our food markets become more bare.

* * *

Let it be noted that the appointment of two Food Administrators has not solved the food problem. It is still with us; daily it becomes more critical. Unless it is solved, and solved quickly, the very food that ex-Food Administrator Wickard said would "win the war and write the peace" may lose the war and lose the peace.

Put very simply and clearly, the food problem amounts to this: we are trying to feed upward of 200 million people. We are trying to do it with the farms and other facilities that heretofore have been capable of feeding about 145 million people (our present population plus a 5% surplus).

Had the Government foreseen the need and planned ahead, we could have begun by 1941 the enlargement of our farm production and food processing capacity. Two irreplaceable years have been lost!

The gravity of the situation becomes apparent when we consider that 50,000 factories are required to process our foods. Food processing not only is America's biggest industry—it is one of America's most important for, without processing, most foods would perish before they could reach the consumer. The term "processing" covers the salting, drying, smoking, pickling, chilling, canning, packing and other methods of preservation that make it possible for us to eat in 1943 food that was produced in 1942. Few realize that most of the food we shall eat in 1943 was produced and processed last year, that most of the seed we plant this spring will grow food for 1944 or perhaps later.

In one important process of preservation, tin and rubber are vital materials. When the Japs captured Malaya and the Netherlands East Indies more than half of the world's tin and nearly all of its rubber fell into their hands. This forced drastic changes upon our entire food economy. The importance of tinplated steel containers, tops for glass jars and rubber gaskets is fairly obvious... metal food containers alone consume, every year, more than 2,700,000 tons of steel.

The aggression of Japan has snared our whole food industry in a maze of intricate packing problems. It has enforced recognition of a new principle of food technology, i.e., that the *method* of food preservation is determined by the *type* of container available. The tin, steel and rubber stringency compels many food processors to adopt

unfamiliar methods – methods that call for a great deal of new equipment. This, in turn, involves the use of critical materials that are so urgently needed for other war purposes.

This conversion of the food processing industry to meet these exacting restrictions has been greatly complicated by two factors that have increased its wartime burden. Indeed, it is these that provide the principal reason for civilian food rationing.

The first of these is the task of feeding our armed forces overseas. Allied ships are being sunk at an alarming rate and the loss of cargo is considerable.

The second factor gravely augments the first. Under Lend-Lease our country is undertaking to feed our Allies to the extent of approximately 60 million people.

Types of food required for Lend-Lease and the armed forces are the finest we can produce. They are the high protein foods, especially meats, cheese and milk; and the protective foods which rate high in vitamin content. Peculiarly enough, the more valuable a food is from a nutritive angle, the more specialized is the processing required to preserve it.

The food processing industry, handicapped as it is, is meeting today's challenge with resourcefulness and enthusiasm . . . despite container complications and shipping shortages.

This is the tenth of a series of editorials appearing monthly in all McGraw-Hill publications, reaching more than one and one-half million readers, and in daily newspapers in New York, Chicago and Washington, D. C. They are dedicated to the purpose of telling the part that each industry is playing in the war effort and of informing the public on the magnificent war-production accomplishments of America's industries.

It is accomplishing its Herculean task by resurrecting and modernizing a method of food preservation that is as old as mankind. Probably you have read a great deal about dehydration. You actually may have eaten dehydrated food, but right now nearly every bit of dehydrated food is earmarked for the armed forces or for Lend-Lease.

Food processing never will be as spectacular as the production of bombers or tanks. But under today's conditions, the performance of the food processor is no less important . . . no less inspiring. When we consider that dehydrated food is compressed into solid blocks with a density nearly equal to that of coal, so that almost a whole meal can be carried in a vest pocket, and that half of the shipping space is thereby saved in transportation, we begin to appreciate what the processors have contributed to meet the food problem imposed by the war.

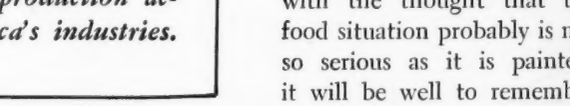
But they have not only contributed new methods, they are achieving new highs in production. And now they are asked to do what borders on the impossible. Consider dehydrated egg powder. Normal production in pre-war years was about 3,000,000 lbs. In 1940 this was increased two and one-half times, in 1942 it was stepped up again, this time forty-fold. And in 1943 the call is for another 60 per cent boost, to make a total of 480,000,000 lbs. Dried milk powder production of 350,000,000 lbs. in 1940 must be increased to 685,000,000 lbs. in 1943.

Vegetables, which were a small item to the processor before the war, now are dehydrated in enormous quantities. The vegetable dehydration industry has had to grow by leaps and bounds without benefit of the high priorities accorded to arms, ship and aircraft building. Production of dehydrated vegetables in 1942 was four times that of 1941, and 1943 calls for a sixteen-fold increase over 1942.

Total dehydrated food production in 1943 is scheduled at 1,750,000,000 lbs., dry basis . . . *all for export*. Multiply that by 10 and you have a rough approximation of the astronomical amount of raw materials that will have to be produced.

Many problems remain to be solved in the troublesome days that lie ahead. But with all his resourcefulness, man has little control over the weather. A severe drought could wipe out all of man's carefully laid plans. If we are tempted to reassure ourselves with the thought that the food situation probably is not so serious as it is painted, it will be well to remember that last year's crop increase over 1941 was due to better than average growing weather.

The war-bred food crisis that now confronts us will be met only by immediate measures to insure a food production ample to allow for adverse weather conditions. The food processing industry is capable, but has not been granted the needed help, in coping with its tasks. The food problem as a whole involves all three functions of production, processing and distribution. And if we are to master the problems that now beset us, all three of them must be coordinated under a single administrative control. "Food will win the war and write the peace". But if American food is to do that double job, we must develop a capacity for food *administration* comparable with the genius of our food industries.



President, McGraw-Hill Publishing Company, Inc.

FOOD INDUSTRIES

FOR THOSE WHO CONTROL QUALITY THROUGH MANAGEMENT AND PRODUCTION

LAURENCE V. BURTON, Editor — APRIL, 1943

Food Production Declining!

IF all voters had a complete knowledge of what has been going on in the processed-food situation for the past year and a half and had a clear idea of what lies ahead there would be a popular outcry which would have important political repercussions. For, instead of increased production of processed foods in 1943, there is going to be a decrease under the 1942 volume.

The expected decrease appears to lie between 10 and 15 percent—this, without allowing for the further possible decreases as a result of adverse weather during the crop-growing season.

We face a grim prospect. At a time when we need the biggest possible processed food production, we can only expect a crop reduction. At the end of one of the most bountiful harvests ever known, we have been compelled to ration food. What sort of drastic rationings will be needed at the end of 1943 when the predictable decline of production becomes a reality?

Will the population have the fortitude to grin and bear it while enormous quantities of processed food go overseas on Lend-Lease? Or will the popular clamor cut off our allies, perhaps forcing them to a weakened military effort because of insufficient food?

How could such an appalling situation have come about? Let's go back to November, 1941. That was five weeks before Pearl Harbor. It seems like ages ago. FOOD INDUSTRIES began an editorial campaign for centralized planning and control of the United States food supply. Maybe you will recall "Central Food Committee Imperative" (November, 1941, page 29) or "Food Processors Must Also Plan," (December, 1941, page 29). And please remember that the entire December issue was printed and in the mails before December 7. In January, 1942, on page 35, there was another editorial, "We Are Losing Precious Time." In recounting these efforts on our part, the purpose is not to say "I told you so," but to refresh your memory for what follows.

When Congress Missed the Boat

Marked copies of these issues or reprints of the editorials were sent to every member of the United States Senate and to most of the House, also to all officers of cabinet rank and to many government administrators. A letter of transmittal accompanied each piece in which the recipient's attention was directed to the urgent need for planning for our food supply. The letter was signed by M. A. Williamson, publisher of FOOD INDUSTRIES and vice-president of McGraw-Hill Publishing Co.

What was the net result? Letters of rather noncommittal character came back, but the campaign continued. One day I called on an important officer in the office of the Quartermaster General. On his desk were about 25 copies of FOOD INDUSTRIES, each carrying the letter of transmittal plus a note from some member of Congress addressed to the Undersecretary of War asking him to compose a suitable answer for the Congressman to sign.

The Army officer was in a justifiable rage, exclaiming, "Here we are in the midst of the biggest war in history and I have to drop all else to write umpty-ump letters a day for Congressmen to sign!"

"But," I protested, "this is none of the Army's business. This is a matter for the civil government—an urgent matter. Send the stuff back and tell those birds to answer their own mail!"

"You forget that this is the Army. I have been ordered by my superior to compose suitable replies."

Some persons excuse the past dilatory attitude of Congress on national defense on the basis that, after all, Congress only reflects the will of the people. But is anyone so naive as to believe it was the will of the people that their representatives should refer a civil problem requiring *statesmanship* to the harassed, overworked War Department whose only possible reply would have to be that the Army was getting what it needed?

Of course the Army is getting what foods it needs! And it will continue to do so as long as there is any food at home.

Blindness and short-sightedness in Washington persisted for well over a year. But at long last Washington is now aware of our national food problem. There are debates about it in Congress. It is front page news, now, and wherever housewives converse food rationing is almost the sole subject of their talk.

Congress is aghast at our national food problems. The Food Adminstration is growing jittery. Food Production Administrator Townsend assures us of the tremendous production obtained in 1942 and points with pride to the *scheduled* production of 1943. But remember it's only scheduled—it is a plan, a hope—it is not yet a crop, nor has the crop been processed and preserved. And it is a hope that cannot materialize. The die has been cast for 1943. It is now time to plan our attack for the 1944 campaign.

Our 1943 processed food production is going to be short. The situation has been canvassed in several branches of the industry in important production areas. A few of the reports are partially quoted here:

Here Is the Evidence

"We are losing help from our factories to farmers! Our factory wages are frozen at 50, 57½ and 65 cents an hour. Farm wages are not frozen. Farmers are taking our help. From five to ten persons a week are leaving. We can no longer operate on three shifts and are going to two shifts. If we cannot meet competing wages we will soon have to go to one shift. We have the raw materials on hand, and a large Army contract. But our rates of delivery are to be cut by one-third and perhaps by two-thirds."—Pacific Northwest.

"Our key men are still being drafted, our farmers are becoming more and more disgusted with the government's treatment of them and more, and more land is being neglected or turned over to hay and grain crops. Farmers who followed the government's request for 'essential' crops last year (tomatoes and sugar beets) took a licking on price, and a licking from labor when the time came to harvest the crops."—California.

"The most serious situation that confronts the canner at this time is freezing of wages to the wage paid in September 1942. The United States Employment Service at . . . is doing everything possible to find labor for the . . . ordnance plant where there is a payroll of 18,000, and they have continually raided us. . . . There are only three or four people around the plant who were there last spring, and it is taking 75 or 80 people to do what 60 were doing. This, in spite of three raises of pay before wages were frozen last September. We haven't enough people to operate and ship at the same time. Our local manager, on the verge of a nervous breakdown, will have to go to a sanitarium to get straightened out.

"If we can't get enough people to run 700 to 800 cases of meat and vegetable stew on a 100-percent Army proposition, how can we be expected to put out a perishable crop like peas that will require 250 to 300 people and not less than 100 able-bodied men, of which we have absolutely none?

"Last year we had 1,264 acres of peas, but the situation convinces us that we would be foolish to chance more than 1,000 acres because everybody is talking of cutting plantings from 20 to 25 percent. I have ordered contracting to begin immediately . . . I am doing it on *faith* and *hope* that we can get some relief at Washington and have cannery wages thawed out."—Kansas.

"The AMA of the U. S. Department of Agriculture has signified that pickles are essential in the eyes of the Quartermaster buyers for the armed forces and has corrected an early false impression that cucumbers for processing belong on the non-essential list made up for the purpose of telling the farmer what to grow this year. Accordingly, when WPB Order No. M-231 on the conservation of fertilizer was issued, they failed to provide, in the prohibition of fertilizer for 1943 crops of melons and cucumbers, for any distinction between cucumbers for the fresh market and cucumbers for processing. They readily acknowledged the error. Correction was made in F.P.O. No. 5, issued January 18, which now grants the farmer fertilizer for cucumbers on pickle contracts.

"Mr. . . . telephoned me from Texas yesterday that he had just come from the fields and was finding it difficult to convince the farmers, who had been told by County Agents not to raise pickles, that they should do otherwise. In fact, he was having trouble convincing County Agents themselves that there was such a thing as F.P.O. No. 5 . . .

"There still seems to be a fight between AMA and AAA similar to that between two political parties. It's very critical to us, and at this moment I would estimate that this year's storage capacity for cucumber pickles will be idle, largely because farmers are discouraged from contracting their acreage by the A.A.A."—Midwest.

"In order to make a normal profit and furnish carrot dices on government orders it is necessary that we purchase fresh carrots at a price not to exceed $30 a ton, and we are asked to do this in the face of Army-Navy cantonment buying at $70 to $75 a ton. We are having excessive difficulty in persuading our old-time growers to continue to grow for us and deliver carrots for us at a discount of some $40 to $50 a ton.

"Carrot seed was contracted for last year at 35 cents a pound. This year growers must pay $3.50. Onion growers who used to pay $0.50 a pound are now required to pay $7.50 to $10.00 for seed."—West Coast.

"The indecisions in Washington, particularly those of the Agricultural Department and the OPA, have hindered greatly our plans of operations this coming season. Just last week we received from the Department of Agriculture the prices to be paid to growers for corn and peas. These prices were received after the AAA committee had been in the field contacting each farmer and practically insisting on an increased acreage of soybeans over last year. We are now contacting the farmers . . . and finding it very difficult to change the farmer's plans. If we had been in the field at the same time as the AAA committeemen . . . and if the USDA had insisted that canning crops be given equal consideration with soybeans, we feel we would be able to contract our normal acreage.

"To date OPA has not announced the ceiling prices on 1943 packs. Therefore we don't know whether we are going to operate at a loss or a profit. Our prices to growers were set by the government (USDA) and the ceiling prices are to be set by OPA. If the latter names ceiling prices lower than the cost of production we, for one company, will be out of business. This is a very, very serious matter . . . If these and other obstacles are not eased soon I predict a very small pack of food."—Illinois.

"It is estimated that the average hourly rate for wage earners now established for New York state processors of perishable fruits and vegetables is less than 50 cents an hour. Other essential war industries are paying substantially higher rates, with the result that a great many workers in food processing plants have been and are being attracted to these other industries, making the attainment of food production goals a most uncertain undertaking . . . There is but little likelihood that realistic planning will forecast an accomplishment equal to 1942."—Upstate New York.

"Our plan for 1943, which we hope can be changed later if we can see daylight, is to contract about 90 percent of the acreage we had out last year. . . . We had 8,000 acres of sweet corn in 1941, 7,000 acres in 1942, and we believe that if we go to 6,000 acres in 1943 we shall be lucky."—Illinois.

"The problem of increased food production is one of applied economics . . . If greater production is needed (and we know it is), reasonable price increases will have to be provided and with profit assured to the grower. Processors in turn will have to be permitted to increase their sales prices in order to insure a normal profit. This does not mean inflation, by any means—just simply sensible regulation."—New York State.

"The biggest drawback to our all-out contribution to the food effort can be summed up in one word—uncertainty. Uncertainty as to manpower, uncertainty as to containers which will or will not be permitted and uncertainty as to pricing policies which, in the past, have forced sales at an actual loss. This lack of decision has stalled all our attempts to plan for maximum production, and if there ever was a year when careful, intensive planning far in advance is necessary to achieve full production, this is it.

"Up to the time of writing we have not contracted for any acreage because we cannot operate between present prices of finished good and the prices we must pay for raw material. The total acreage for which we dare commit ourselves will be less than if we had some assurance of fair treatment.

"It would be most helpful if food processing were placed in the same category as farming when it comes to labor. Since the announcement of nondeferable occupations was made, we have lost a great many men who have gone to more obvious war industries. If 2-B and 3-B classifications could be granted for food processing work, we believe this drain would stop. A more general recognition of the importance of food processing, and grouping it with farming, is needed to preserve the maximum amount of food."—Tri-State.

To quote more would be mere repetition. While labor scarcity is acute it is not the only problem. And school-age workers are not the answer, for they seldom know "how to work"—that steady, persistent drive of the experienced worker, the drive that really produces results. The real basis of our dwindling food supply lies in the amazingly complex organizational set-up created by the President of

the United States. No one person and no one body can cope with any major problem such as food supply except the President himself or perhaps his alter ego, James F. Byrnes, the "No. 2 President." But Mr. Byrnes and the President are both lawyers. They judge on the evidence, and if the evidence is incomplete it is most unlikely that their instincts will cause them to sense its lack. (The situation has been made more complicated, rather than simplified, by the appointment of Chester C. Davis as Food Administrator. Authority, instead of being concentrated in the hands of the new administrator, is only further subdivided by this new move.)

Every agency has its duties and seems to carry out its respective missions with faint regard for the major problems that lie beyond their general directives.

Thus OPA is expected to hold down prices and ration the food supplies. AAA decides what the raw materials shall cost. But USES siphons off the food-plant labor and Mr. Byrnes freezes food wages at last autumn's levels. WPB orders one thing, and some other agency, such as FPA, must change it. Or take another case—the WPB orders to stop production of heavy (40 percent) cream. The cry immediately went up for more pasteurizers, more spray-drying equipment, cheese vats and other facilities needed to take care of the milk. This required action by other branches of WPB who were not present and could only be "sold" after long and costly delays.

Dr. Russell M. Wilder, who is nutrition adviser to FDA, wants the dry milk content of bread increased from 3 lb. per 100 lb. of flour to 6 lb. because meat scarcity will force greater bread consumption. No one will question the nutritional goal, but no one who understands the complex setup expects it to be attained for an indefinite period. For WMC must provide enough milkers, and WPB must permit enough milking equipment. OPA must permit powdered milk prices to go high enough to get production and distribution. Some agency must hold back enough cows on the farms to provide the milk. OPA or AAA must permit feed prices to go to levels that will insure milk production. FDA must permit production of heavy cream. Then it must either persuade OPA to allow butter prices to be high enough to use the cream for butter making or permit increased production of ice cream (if the sugar can be had). Otherwise, FDA must persuade ODT to permit more refrigerated transport to be used to haul the cream to cities. WPB must permit more separators and pasteurizers to be built (if the stainless steel is available). But up to now no special mention has been made of the needed additional boilers, evaporators and spray drying equipment that would be needed. And who knows whether there really are enough cows to increase the milk flow even if all the other conditions were met?

I am not sure that I have discovered all the ramifications of even so small a problem. But coordinated action will be months in coming, and even after that the crop schedule could be knocked into a cocked hat by adverse weather.

Why go on? When your wife complains of the increasing scarcity of food you might write to your Senator or Representative and inquire why he referred a civilian food problem to the Undersecretary of War in the winter of 1941-42, or why he has assented to an administrative setup that is so cumbersome that it cannot function before it is too little and too late.

Production of perishable foods for processing in 1943 will be at least 10 to 15 percent below 1942. This diminished production is what we shall have to share with our Lend-Lease allies, and what is left will be what we shall eat in 1944. Don't allow anyone to kid himself about the current scarcities. What we are currently eating is largely 1942 production—not this year's, but last year's production. In 1944 you will see some real rationing!

What can be done to remedy the situation? I know only one quick general remedy for impending food scarcity. That remedy is increased selling prices, labor prices, farmers' prices. It's too late to do much else despite the fact that an increase in living costs will bring on a wave of strikes and set up the same problems all over again.

Chin up and cheerio.

L. V. Burton EDITOR

The Talk of the Industry

• Coming Events: Chestnut Farms Dairy has been advertising in Washington newspapers for young women for daytime milk-route work. Can there be any greater incentive to the head of the house to remember to mark the

milk ticket and pay the bill than a comely milk-route sales lady?

• Paul S. Willis, President of Grocery Manufacturers of America has called for a "Casablanca on food," a world food conference, with representatives from all of the United Nations. They are to lay all their cards on the table and decide what each can produce and what each must import from others. We hope Mr. Willis' call will be heeded, and that Governor Lehman of OFRR will be well represented, for he is apparently planning on feeding occupied nations from our empty larder.

Can you imagine the United States laying *all* the cards on the table?

• Sliced bread has been restored, and an unconscionable amount of foolishness has thereby been stopped—for the time being. Despite what some articulate subscribers to Food Industries have argued, we are unconvinced about the difficulty of slicing bread with a carving knife. One tenderhearted soul wrote in about the problem of slicing bread with a dull knife. O.K., but isn't it even more difficult to cut meat with a dull knife? And what good is a dull knife, anyway?

• New Sales Argument: Birdseye Frosted Foods has taken advantage of the point rationing situation to advertise a comparison of the number of points to be given up for frozen foods compared to the number for cans of equal net weight of the same food. The comparison is for "containers that serve four." The advantage is notable in some foods: Frozen peas take 10 points while the canned peas take 16. Green beans run 7 to 14. Green Limas, 10 to 16. Spinach runs 10 to 14. Corn has a less advantage, being 7 to 8.

Here is a sort of price competition over which the manufacturer has no power at all.

• "ANONYMOUS," in a courageous mood, sends in a clipping from the *Seattle Post-Intelligencer* that is interesting, as well as important, if true. Summarized, the items says that Nome, Alaska, with only 400 inhabitants, has received 350 tons of butter, 175 tons of coffee, 78 tons of salad oil, 59 tons of soap, 503 tons of canned milk, 70 tons of canned pears, 78 tons of dried eggs and 78 tons of toilet tissue. Much of the material is deteriorating, according to the report because of lack of storage facilities.

If the report is correct it evidences an outrageous muddle, but one wonders if these tons were actually *cartons?*

Our New Style Binding

Subscribers' attention is invited to our new type of binding which permits the magazine to open flat. Even though paper rationing has forced narrower margins upon all McGraw-Hill magazines we hope that the new and more expensive binding will relieve some of the annoyance, particularly to those who bind their issues.

Packaging Conference And Exposition

Your attention is invited to the Annual Packaging Conference and the Packaging Exposition, sponsored by American Management Association, and held at the Hotel Astor, New York, April 13 to 16. Both are worthy of your time, particularly when packaging problems are acute. Admission to the exposition is by registration without charge, provided you have a business card or other identification with a concern which uses packages. To get into the conferences, however, there is a cash fee. We understand that dehydrated food packaging will be discussed authoritatively, and that compressed foods will be displayed in the exhibits.

P-140 Container Order Has Everybody Guessing

Priorities have been issued to cover wooden and both solid and corrugated fiber shipping containers under WPB Order P-140, published on February 25 in the *Federal Register* (page 2378). Throughout March everybody has been much disturbed, though more because of what the order omits from priority ratings than because of what it includes. Manufacturers of foods that are listed will, of course, know exactly where they stand. The order is, however, *not limited to food containers* but includes a host of other products, chiefly materiel of war.

AA-1 is granted to containers for subsistence items including emergency rations, canned meats, fish, poultry and dried eggs, canned butter and powdered milk, or for delivery or shipment of materials, to be incorporated in the foregoing products, if they are to go to Army or Navy.

AA-2X is granted to any other items of food for export or for Army-Navy, except Post Exchanges, and for food "set aside" or frozen by the Director General of Operations or the Secretary of Agriculture and for "controlled meats" (OPA Restriction Order No. 1).

AA-3 is granted for many other foods, including 10-lb. butter packages, also dried apples, apricots and peaches, edible oils and greases in 30-gal. containers, fish and shellfish, market milk, 16 raw fruits and vegetables, 10-gal. fruit and vegetable juices, fresh meat and meat products, lard, 10-gal. honey, 5-gal. lard, tallow and shortening, and 5-gal. pickled foods.

AA-4 goes to 5-gal. beverages, canned foods, dairy products and dried, preserved or frozen foods not previously specified, 25 additional raw fruits and vegetables, 5-gal. molasses, poultry and eggs, egg products and shortening and edible oil. (What are preserved foods?)

AA-5 is for beverages and all other fresh fruits and vegetables.

The P-140 order does not cover the use of bags.

Here are a few of the food items that are not encompassed by the order, the manufacturers of which are now wondering just what they can use for shipping containers. This list makes no pretense at completeness:

Sugar, coffee, tea, flour, salt, flavoring extracts, biscuits, crackers, chocolate, cocoa, confectionery, packaged dehydrated soups, condiments, vinegar, macaroni products and specialties, to mention only a few.

Manufacturers of the many omitted items are in no greater quandary than the makers of shipping containers, for the latter are now trying to develop a priority scheme that will work. One suspects, however, that the situation will be not much worse than existed in the fall of 1941 when containers were almost impossible to get. Unless food processors are assured of shipping containers, repackaging studies are in order, pronto. The only relief for products not listed is to file Form PD 802.

Hors d'Oeuvres

• A manufacturer of food cans is now making containers for 30-caliber machine gun bullets, a package that opens the consumer.

• *Soldiers, says "Time," like hot dogs better than any other meat. They must think Army life is a picnic.*

• Will women answer the manpower problem? Well, they've always had an answer so far.

• *After 85 years in the dairy business, The Borden Co. is making postwar plans to sell canned fish. Now the promotion boys will have to dream up a mermaid cousin for Elsie.*

• An employee standing before a bulletin board in a Philadelphia instrument plant sees his face reflected in a mirror over the slogan, "V depends on me." Others please copy.

• *Food supplies of continental Europe, exclusive of Russia, are estimated to be only about 15 percent below the postwar average. So the axis will be able to stomach the war until their diet is changed to one of lead.*

• Price ceilings on meat are putting some of the small packers out of business. If this keeps up what will the people use for meat, bungling bureaucrats?

• *While watching a propaganda film showing Germans giving food to the people in Norway, a Norwegian patriot stood up and shouted, "Stop. You're running the film backwards."—Anyway, it's a good story.*

• A tile manufacturer is compressing dehydrated foods in presses formerly used to make building tile, and a locomotive works is making presses for compressing these foods. The food business certainly gets around.

• *They say there is a need for ways to glamorize jobs in food plants. But why not give the workers part of the production? These days people would rather have food than glamor—or are we getting old?*

• The new meat ration is about twice the amount allowed to the Britisher. So if you can't get any meat today, at least you can't get twice as much as if you were in England.

• American flyers in England put prepared ice cream mix into a can and anchor the can to the rear gunner's compartment on a Flying Fort. After a high-altitude flight and a little jouncing around by enemy ack ack, the mix is well shaken up and nicely frozen. And some food manufacturers have trouble improvising.

• Peas, beans and lentils when bought exclusively for seed are exempt from rationing. A lot of victory gardens may go into the pot without being planted.

• *It is the task of the food industries in wartime to make war fare.*

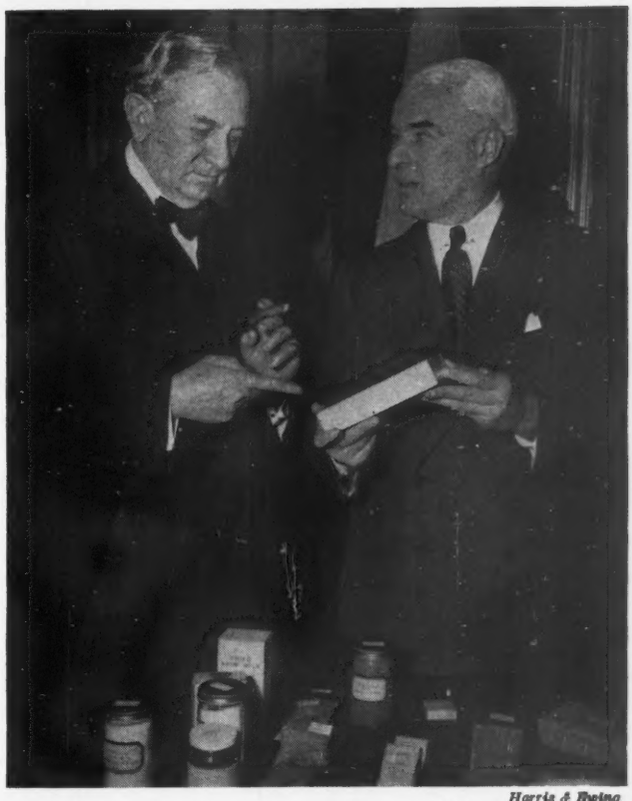
• Congressman Wright Patman has reintroduced his bill to change the legal name of "dry skim milk" to "dry milk solids." He wants to call a spade a pancake turner.

F.K.L.

Why Lend-Lease Foods Are Sold By the British*

By EDWARD R. STETTINIUS, JR.,
Lend-Lease Administrator

Here is an official explanation of a practice that has puzzled many Americans. It's really quite logical. Here also are some surprising facts about the reciprocal value of Lend-Lease. It is by no means a one-way proposition



Harris & Ewing

Lend-Lease Administrator Edward R. Stettinius, Jr. (right) and Senator Tom Connally examing samples of dehydrated foods during the Senate Foreign Relations Committee hearing on Lend-Lease. Dehydrated foods are shipped extensively under Lend-Lease.

WHEN articles are transferred or services rendered under the Lend-Lease Act, it is a transaction between the governments concerned, and not between private interests in either country. But the way in which the goods received are distributed for use depends upon the kind of goods transferred and the availability of distribution technics of various types in each country. The problem in the Soviet Union has one aspect, and quite another appears in China. Where there are highly developed and reliable commercial organizations for carrying out economic policy, under strict government controls, they are used in appropriate cases under conditions which assure proper utilization of Lend-Lease supplies. Such organizations exist in Australia and other parts of the United Kingdom.

The distribution of Lend-Lease supplies in Great Britain is accomplished in ways which best utilize available economic organizations. If the Lend-Lease materials consist of munitions or other articles which are to be used directly by the British government, or by one of its agencies or a branch of one of its armed services, they are, of course, simply handled and used by agencies of the government itself. But for foodstuffs which are to be used by civilian consumers, special arrangements are necessary. For one thing the distribution of such goods outside of organized wholesale and retail channels would require a new distributive organization. And this would represent an uneconomic use of the manpower presently available in the United Kingdom. For another, free distribution of such consumers' goods would have an inflationary effect by freeing purchasing power.

These considerations do not invariably apply. The distribution of foodstuffs and medicines when there is dire need is an obvious exception. Distributive organizations —such as schools, clinics or hospitals— already exist for such cases, and the inflationary consideration is a secondary one. Consequently, the British government does distribute milk and other supplies free of charge through such organizations for the benefit of children, mothers and others in need.

Must Use Normal Channels

But in the normal civilian consumption of foodstuffs, the considerations involving inflation and the creation of a new distributive organization are predominant. As a result, it has been considered advisable that all food distribution in the United Kingdom (except in the case of free distribution of the kind described above) be carried out by wholesalers. The British government sells food to these wholesalers whether it is obtained through Lend-Lease, is produced domestically or is imported by the Ministry of Food. Close control over all distributive margins is established so that neither the wholesalers nor the retailers receive any greater remuneration than is sufficient to cover the cost of the services when performed. Prices are controlled and the general arrangements fit into the British government's policy of stabilizing the price level of foodstuffs. That policy, as set forth in the British White Paper of September 10, 1941, is as follows:

"The general principle followed in this matter is that the remuneration received by the distributors, whatever the method of distribution, is controlled and will be no more than a fair return for the services rendered in the work of distribution. The arrangements rigorously exclude any opportunity for a speculative profit by private interests from dealing in Lend-Leased goods. In most cases, Lend-Leased supplies will be distributed through organizations acting as agents of His Majesty's Government in the strict sense of the term and not as principals. Where for strong practical reasons this cannot be done a full explanation will be supplied to the United States administration and their concurrence sought beforehand in any alternative arrangements proposed. The justification for retaining existing channels of distribution operating under strict government control is that the creation of elaborate new organizations in their places would inevitably result in loss of efficiency and the wasteful use of manpower, and retard the war effort. In the distribution of Lend-Lease goods there will be no discrimination against United States firms.

"Food is a special case. Only some 5 or 6 percent in tonnage of the total British food supply is coming from the United States, and without great practical complications it would be impossible to have a separate system for the distribution of Lend-Lease food. Food distribution is carried out in the United Kingdom by wholesalers, to

* This article is based upon testimony before the Senate Foreign Relations Committee at the hearing on the extension of the Lend-Lease Act.

whom the government sells food as principals. In fact, the Ministry of Food has established a close control over all distributive margins so that neither the wholesalers nor the retailers receive any greater remuneration than is adequate to cover the cost of the services performed. No food obtained on Lend-Lease terms is, or will be, sold at uncontrolled prices. Thus the general arrangements as regards the issue of Lend-Leased food fit into His Majesty's Government's policy of stabilizing the whole price level of foodstuffs, a policy to which the government contributes £100 millions a year."

The United Kingdom has not been asked to turn over to the United States the sterling proceeds which it receives in those special cases where Lend-Lease food is sold to the civilian population. The retention of such proceeds by the British government is consistent with its attitude toward our government in the case of materials furnished by it to us as reverse Lend-Lease. Major George Spiegelberg, in his testimony before the Senate Foreign Relations Committee, pointed out that the British supply as reciprocal aid articles sold in our Army canteens in the United Kingdom. These are sold to our soldiers and the proceeds retained by the United States. Similarly with benzol and other products which the United Kingdom sends to the United States as reciprocal aid—the commodities are often disposed of in normal channels and the proceeds retained by the United States.

The retention by the British or the United States governments of any sales proceeds from the distribution of goods received under Lend-Lease or reverse Lend-Lease does not result in any benefits to either government—other than those which come generally from Lend-Lease aid and reciprocal aid. Foodstuffs sold by the United Kingdom are included in the records of aid supplied under the Lend-Lease Act. Records are likewise being maintained of materials furnished to our government as reciprocal aid. All such aid will be given proper consideration when the Lend-Lease settlements take place.

Lend-Lease Food Exports in Relation to Supply.
Year Ended December 31, 1942.
(*Millions of Pounds*)

	Lend-Lease exports	Supply	Exports in percent of supply
All meats	1,134	22,742	5.0
Beef	18	9,155	0.1
Veal	0	1,110	0.0
Lamb and mutton	4	1,068	0.4
Pork	1,112	11,409	9.8
All milk products (expressed in terms of fluid milk equivalent)	4,272	125,466	3.4
Dry whole milk†	4	66	6.1
Dry skim milk†	135	586	23.0
Condensed and evaporated milk†	347	4,842	7.2
Butter	17	*2,294	0.7
Cheese	312	1,352	23.1
Fats and oils	723	5,470	13.2
Eggs	‡684	6,819	10.0
Fish (frozen and canned)	156	2,189	7.1
Canned vegetables	51	*6,630	0.8
Canned fruits and juices	89	*5,150	1.7
Corn and corn products	415	300,048	0.1
Wheat products	393	118,020	0.3

* Production. † Included in "All milk products." ‡ Dried eggs expressed in terms of fresh egg equivalent.

It has been considered unwise to ask that the proceeds of the sale of Lend-Lease food in Great Britain be turned over to the United States government. These proceeds are in pounds. And pounds cannot now be converted into dollars without wrecking the mechanism of international exchange which Lend-Lease is designed to preserve and protect. The proceeds cannot be kept in blocked balances, to be used after the war, without becoming in effect fixed war debts. It is our basic policy at this time not to anticipate or to prejudge the terms of final settlement by administrative arrangements which would have this effect. Pounds cannot be used at this time, since the British government is now supplying us with all the goods and services, purchasable in pounds, which reasonably may be supplied under the circumstances. Thus the policy pursued is the only practicable one.

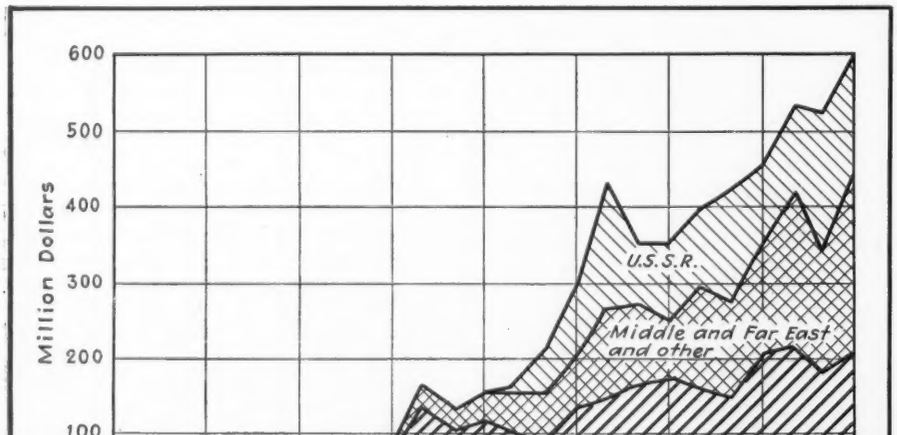


Chart showing value of Lend-Lease goods exported each month, by country of destination. (From Report to the 78th Congress on Lend-Lease Operations.)

It Works Both Ways

Lend-Lease in reverse has reduced cash expenditures for supplies and services for the American Army in Great Britain to the extent that in December we spent about $25,000 a month. And our experience with Lend-Lease in reverse is in marked contrast with the experience of the United States forces abroad during the last World War. In the last war some $2,250,000,000 was expended in the period of a year and a half by our Army in France and Britain. In this war, the total dollar purchases of our Army in Great Britain from July 1 to Dec. 31, 1942, amounted to less than $1,000,000, and they are declining month by month.

Lend-Lease in reverse is one of the most inspiring chapters in the history of Lend-Lease and in many respects aid given to our forces abroad has meant greater hardships to our allies than Lend-Lease has meant to Americans.

For example, the civilian population of New Zealand is suffering from food scarcities as a result of Australian and New Zealand aid to United States forces in the Pacific. In contrast, Lend-Lease shipments of food to all nations by the United States since March, 1941, represented less than 6 percent in dollar value of our total food supplies.

Every division of our armed forces abroad had received aid under reverse Lend-Lease. But a few of the more important items follow:

Several hundred Spitfire planes, field guns and howitzers, 1,450,000 square yards of portable airfield runways, 15,000 bombs, 70,000 rounds of 6-in. shells, many millions of rounds of small-arms ammunition, more than 250,000 antitank mines, electric batteries at the rate of 500,000 a month, 500,000 hand grenades and more than 1,000 parachutes.

In addition, in the process of being received are 2,000,000 blankets, 2,000,000 sets of underwear, 4,000,000 pairs of wool socks and new hospitals with a bed capacity of 89,000.

One final point should, however, be emphasized. If the disposition of Lend-Lease goods results, at any time, in unjustified benefits to a foreign government, the Office of Lend-Lease Administration, acting with the State Department, the Treasury and the other interested government agencies, is empowered to, and will, reexamine the basis on which Lend-Lease aid is furnished and distributed and make such adjustments as may be necessary.

A Challenge to Food Technologists

Wartime needs call for strong effort to develop food from unusual sources. Oil-seed meals offer an opportunity for preparing high-protein foods

Additional scientific data, as well as practical production knowledge, are needed for the task of developing new foods from unusual sources.

MORE food is needed. Strenuous effort must be made by technologists to provide it. Greater yields from food raw materials are essential. And food must be made in large quantities from unusual raw materials. It is difficult to exaggerate the urgency of the problem of stimulating new food supplies in the United States, especially supplies of protein foods and of edible fats and oils.

The problem of protein supply is the most serious and more protein foods must be developed. One such project, which now is only a possibility, illustrates well the technologist's difficult job.

The greatest unused pool of potential protein food is the supply of seed meal made when peanuts, soybeans and cottonseed are crushed for oil. Normally a little of some of these seed meals is used for food. Most goes for feed and fertilizer. During 1943 there may be produced in the United States about one and a half billion pounds of peanut meal, and about three and a half billion pounds of soybean meal. An effort must be made to put at least a billion pounds more than usual into the food stream.

Five Steps To Be Taken

Probably five steps must be taken by scientists and engineers in food technology to insure that such an effort can succeed:

1. We must make the present raw material of better grade so that it is suitable for food supply and not merely a feed raw material which contains fragments from the haircloth of the press and also other contaminants improper in food materials. That is obviously a job to be done by technologists in the seed crushing business.

2. More scientific facts are needed regarding the dietetic value of each type of meal so that blends of meals or mixtures of meals and other protein materials can be made which are adequate substitutes for meat. The substitutes must contain the various amino acids required to give full protein nutrition.

3. The availability of materials to fortify meals with missing components and to make the meals more palatable for the average consumer must be sought. Some people think that concentrated amino acids of a certain type will be developed practically on the scale necessary to fortify much of the material otherwise significantly deficient. Certainly, there is also a great job of development of savoring materials to make mixed seed meals most usable at the dinner table as a meat substitute.

4. Once we know what meal mixtures and savors and other amendments are needed, there then is the job of finding practical technical means of preparing the product desired. This is a practical technologists's job.

5. Then the home economist must get busy. Until she gives her approval, the product is not really ready for marketing.

Must Please Housewife

Assume that Mrs. Housewife goes to the store and buys a package of "vegetable meat," or "vegetable sausage," or "vegetable scrapple," or "semi-sausage," or some other product made of or containing these vegetable meals. What is necessary to get her to be a regular purchaser? Remember, only if she buys regularly is it useful to prepare these things on a big scale for general distribution.

Obviously, Mrs. Housewife wants conveniently and quickly to take from a suitable package the material that she can prepare for the table and please her family on days when the meat ration does not permit a normal beefsteak, pork chop, or leg of lamb. She might take the material from the package as a ready shaped meat cake or slice it from a loaf like a portion of scrapple. Or she might take out a dry material which must first be mixed with a little milk or water and shaped up into a loaf or cake before frying or baking or other preparation to serve. The important things are: First, that she use ordinary kitchen methods; and second, that the product look attractive and taste good when the family eats it.

Any home economist or food technologist of experience knows that these objectives on the whole can be reached only with a suitably savored product ready mixed and easy to prepare. Thus, if we want a meat flavor with a meat admixture, we have to have added at the plant, not in the kitchen, something to give that flavor. If the product is supposed to be spiced or otherwise savored, we must have added a suitable amount of sausage spice or other food condiment that will make the seed-meal product more tasty. The technic of doing this will not be difficult. But the selection of materials with the present shortage of seasoning commodities is a problem.

There will be many questions raised as to whether a direct meat substitute should be made in the fashion implied by this example. Many people will glibly say that it is much better to use such meals in baking so that a high-protein breadstuff will result. Others have many other interesting and worthwhile ideas as to the use of these meals in special products that one can hardly call acceptable meat substitutes on the dinner table. All of those efforts should continue. The meat substitute idea is merely another way in which oil seed meals can perhaps render a higher service in feeding America and her Allies.

Others will feel that taking the meal for food will unduly deplete the feed supplies. Obviously, if a billion pounds is used direct as food it cannot become an indirect food by growing animals for the slaughter. Yet the direct usage is probably quicker and it may be more efficient on the overall diet economy. Certainly much direct usage as food will be desirable later this year. It is doubtful whether this food usage can possibly grow so fast as seriously to deplete feed supplies.

One might take a half dozen examples of other protein raw materials and discuss at great length their adaptation as meat substitutes. Such discussion is not appropriate here. But such effort is an essential responsibility of the patriotic food technologist.

Also comparable effort must be made in adapting more oil and fat supplies to food uses.

Choose Floors That Withstand Conditions of Processing

By RICHARD KANEGSBERG, Kayel Engineering Co., Newark, N. J.

PART II—Chemical and physical characteristics of flooring materials govern suitability to various food-plant requirements and should be considered when selecting floors for processing departments

IN the first part of this article (FOOD INDUSTRIES, March, page 58), wood, linoleum and rubber, and portland cement floors were discussed. The present installment covers asphalt, magnesite, and brick and tile floors for food plants. Among these is a solution to your floor problems.

Asphalt

Floors of asphalt mastic over a wood or concrete base have found wide favor in the past and are widely used. Asphalt is soluble in oil and grease, and will not stand up under long-continued high temperatures or hot-water wash. Although pure asphalt is not affected by weak acids or alkalies, the aggregates used in mastic floors may be attacked, unless special acidproof aggregates are specified. Sugar solutions attack and soften asphalt, and milk will penetrate a mastic floor to react with the aggregate.

Asphalt is used on floors in two forms, hot-applied and cold-applied. Hot mastic is compounded of hot asphalt with an aggregate of sand and fine stone carefully graded and mixed to form as dense a mixture as possible. The mix is spread 1 in. or more in thickness over a prepared floor surface and, while still hot, is troweled and tooled into place to make a pavement similar in appearance to the familiar asphalt street paving. Such a flooring, resistant to acids and alkalies, is still quite porous, and if a waterproof job is desired, a waterproof membrane must be installed on the base before the mastic is applied.

Cold-applied mastic is compounded of asphalt emulsion with a suitable aggregate to make a similar topping compound which is spread in the same manner as portland cement mortar. It "sets" because of the evaporation of water which causes the water-soluble asphalt emulsion to "break" to adhesive asphalt binder not soluble in water. These toppings are also porous and cannot be considered waterproof without a base membrane. The cold mastics have found wide acceptance because they are low in cost and may be installed by plant maintenance men as a patch material or as a smoothing coat over worn floor. It is possible to make a thin coating adhere firmly to a clean surface and to work in a feather-edge on a patch. Care must be observed to see that the coating is thoroughly dried out before it is allowed to sustain traffic or water wash. If water is allowed to flow in cold mastic before it is completely dried out, the asphalt emulsion not "broken" may be diluted and wash out, allowing the coating to disintegrate even though the surface may be hard.

The asphalts are subject to cold-flow, being plastic materials, and move slowly under pressure, and the feet of heavy machines will slowly sink into such surfaces. Oil and grease drippings must not be allowed on these floors, special pans being required around machinery and moving parts. Once softened, an asphalt floor cannot be rehabilitated and the damaged section must be replaced with new material. Most asphalt floors, properly installed, will handle moderate wheeled traffic, but since the surface is comparatively soft, they are not suitable where barrels may be dropped or where similar cutting edges may tear the surfaces. The effect of hot-water wash on mastic is the same as the effect of acids on concrete—the mastic in this case is softened and the aggregate washes out, leaving a spongy mass that soon disintegrates.

Magnesite

Laboratories and other light-traffic areas are often floored with magnesium oxychloride cements, commonly called "magnesite." This is a compound of magnesium oxide, calcium or magnesium chloride, sawdust and other fillers. It is light in weight, not affected by oils or greases, alkalies or salts, but, being quite porous, is not well adapted to constant immersion in water. When heated, it is likely to crack and buckle because of dehydration. New magnesite flooring should be treated with wax or oil to reduce porosity and to make the material more resistant to water. Sugar solutions and milk may be absorbed and will ferment, causing rapid disintegration from the resulting acid formation. Acids are most destructive since the magnesite is an alkaline material and its porosity allows the acid to reach the entire structure. Magnesite is useful in areas where it must be occasionally cleaned with strong alkaline cleaners, but in this case the surface must be protected periodically with hot applications of linseed oil, or waxed to maintain it in good condition. One of the chief advantages of magnesite is the fact that it may be obtained in various light or dark colors. A polished surface is most essential in keeping the lighter colors at their original brilliance.

Brick and Tile

Ceramic materials in a wide variety of shapes and sizes find extensive use in food plant construction. Ease of cleaning and fine appearance, as well as great resistance to wear, have been prime factors in dictating the selection of this class of materials. Special grades of quarry tile for light service and vitrified tile and brick for heavier service are now made with particular attention to their use in food plants, and extensive research and constant improvement have brought these materials to a high point of perfection. Although the first cost of ceramic floors may be slightly higher than that of other materials, the resistance and long life of such floors warrant the extra expense.

Quarry tile of the "flint" grades is useful in light traffic areas, especially where advantage may be taken of one of the many attractive colors to produce a bright attractive floor surface.

By far the most resistant material for food plant floors is vitrified brick and

tile. The best type for floor work is a product made especially for this service —hard, tough, dense and practically nonporous. The brick is made under a de-airing process which removes all trapped air from the mud before the brick is fired, producing a piece almost as dense as a piece of glass. The porosity of this class of brick is measured in terms of its absorption and is a fraction of 1 percent. For light service a type known as "creamery tile" or "floor brick" is used, this brick being 1¼ in., 1⅜ in. or 1½ in. thickness. For heavier service, a piece 2¼ in. thick is used, and for extremely heavy service a brick 3¾ in. thick is available. These brick pieces may be obtained in a variety of surface treatments, smooth, scored, pebbled, or embedded with gritty nonslip materials. One type is supplied with a salt glaze surface in which is embedded a nonslip grit, and is known as "packing-house tile." Special shapes are made to form cove bases and rounded corners for sanitary installations.

Since the best of brick floors are no better than the jointing materials, special attention must be given to this subject. A poor joint will erode and allow traffic wear to break down the edges of the adjoining bricks. Jointing materials are commonly based on portland cement, sometimes mixed with various waterproofing compounds to reduce porosity. Some specifications utilize the so-called Navy cement, a finely ground mixture of portland cement and sand. The main object of a good floor brick job should be the production of as close joints as possible, and the finer the joint, the less is the likelihood of corrosion attack on the jointing material.

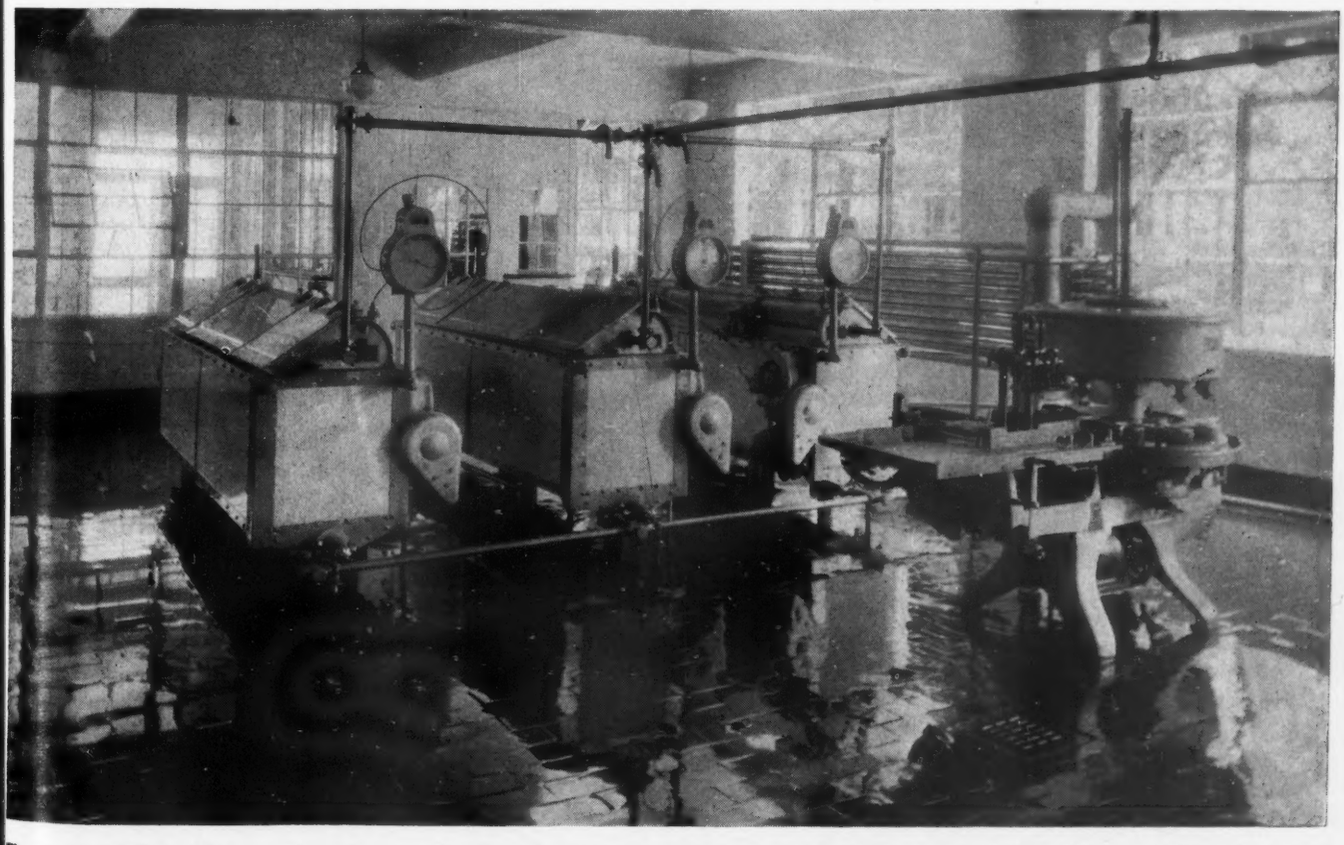
Good floor brick is not affected by any acids except hydrofluoric, nor by the ordinary strengths of commonly used alkalis. Hot concentrated caustic will slowly attack brick surfaces. Being nonabsorptive, a good floor brick will not harbor bacteria or microorganisms, nor will it allow liquids to ferment within its structure. Not so the joints. Poor jointing materials have been responsible for a number of floor failures in good plants, and before a brick job is specified for any use, particular study should be made of the jointing compound to be used in order to verify the resistance to the conditions that will be met on the finished floor.

The jointing materials based on portland cement are subject to the same attacking influences as affect portland cement in concrete floors. Porous joints are broken out by the expanding effect of crystallization. This allows the entrance of more saline solutions and further disintegration to the point where, in extreme cases, the expanding effect of crystallization is of such great degree that the entire floor arches off its base.

Nowadays, more stringent specifications for the cleaning of floors impose even more difficult service conditions on the floor surfaces. Floors must be cleaned with strong boiling water streams, followed by chlorine solutions and alkaline cleaners, then flushed with hot and cold water, taking the entire range of chemical and physical raking. The thermal shock of boiling water alone is enough to break up ordinary floor surfaces. Cement joints are no exception to this attack and may quickly erode unless carefully selected and properly installed.

In late years research aimed at protective surfaces for the chemical industry has produced a few substances eminently suited for jointing floor brick. One such material is a synthetic resin used as a mortar. In practice, a concrete base is prepared over which is spread an impervious membrane resembling tar but having a tacky consistency. The floor brick are "buttered" on the edges with the resin mortar and are then shoved into place, bedded on the membrane. The joints resulting from this

(Turn to page 124)



Floors of vitrified brick or tile, when combined with properly selected jointing materials, are the most resistant to conditions encountered in food plants where sanitary requirements impose a severe cleaning schedule.

Dehydrating Fruits, Vegetables In Community Canning Plants

By JOHN A. SCHALLER
Associate Agricultural Engineer, Tennessee Valley Authority, Knoxville, Tenn.

Restricted supplies of tin cans and closures for glass jars encouraged development work to enable more than 500 community canning plants of the southeastern states to convert to dehydration *

COMMUNITY canneries in the southeastern states, numbering approximately 550, may be faced with a conversion of their normal canning operations to some other method of preservation because of the need for conserving tinplate used in the manufacture of tin cans. The present emphasis is toward dehydration, which could not be successfully developed without having basic information on proper equipment and operating technics. The necessary technical information for an expanded program was not available and had to be determined through actual studies on a community scale.

To meet this need, the Tennessee Valley Authority, in cooperation with the University of Tennessee Agricultural Experiment Station, Georgia Agricultural Experiment Station and the Georgia Division of Vocational Agricultural Education, is conducting intensive studies on the development and adaption of equipment and technics for dehydrating southern grown fruits and vegetables on a community scale. It was realized that the successful conclusion of these studies would permit the saving of substantial quantities of agricultural products that could be used for home consumption, thereby releasing commercially processed foods for other needs.

The objectives of this research program are:

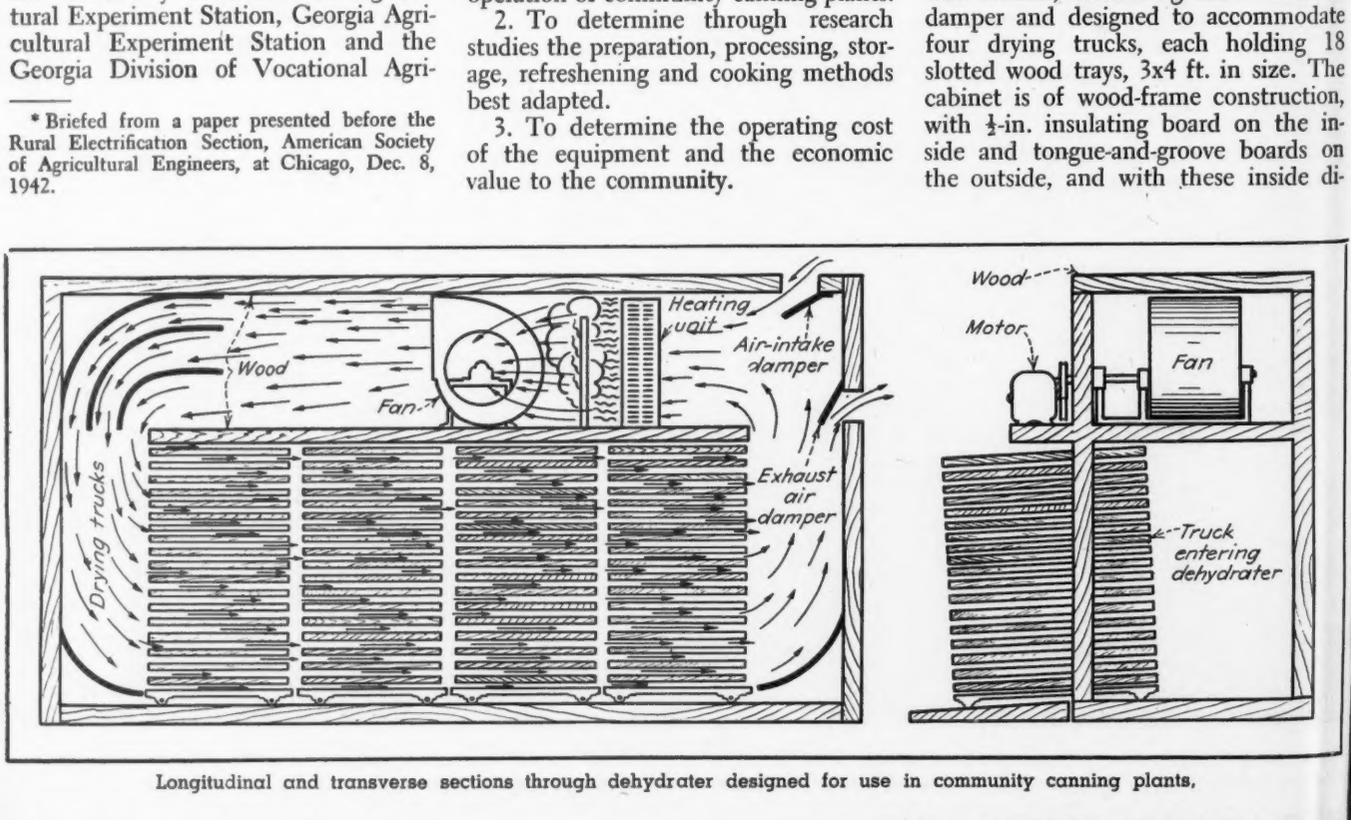
1. To develop or adapt equipment using the least amounts of critical materials for dehydrating products on a community scale similar to the present operation of community canning plants.
2. To determine through research studies the preparation, processing, storage, refreshening and cooking methods best adapted.
3. To determine the operating cost of the equipment and the economic value to the community.
4. To make this information available to interested educational agencies for use in 1943 to encourage maximum practical use of this method of food preservation as part of the war effort.

* Briefed from a paper presented before the Rural Electrification Section, American Society of Agricultural Engineers, at Chicago, Dec. 8, 1942.

Design of Dehydrater

A cabinet-type dehydrater was designed to fit into existing community plants where preparation equipment and steam boilers were already available. In selecting materials of construction, particular attention was given to using nonessential materials as far as possible, while still securing a workable, safe and reasonably economical unit, and to the use of building materials locally available. The design utilizes commercial unit heaters, fans of known output and commercial control equipment.

As shown in the accompanying sketch, this dehydrater consists of two parts: A *top section*, or fresh and return air duct, containing the heating unit, fan and air-intake damper; and a *bottom section*, containing the exhaust-air damper and designed to accommodate four drying trucks, each holding 18 slotted wood trays, 3x4 ft. in size. The cabinet is of wood-frame construction, with ½-in. insulating board on the inside and tongue-and-groove boards on the outside, and with these inside di-



Longitudinal and transverse sections through dehydrater designed for use in community canning plants.

mensions—approximately 4 ft. wide, 17 ft. long and 8 ft. 9 in. high. The heating tunnel is approximately 2 ft. 10 in. high and the drying tunnel is approximately 5 ft. 7 in. high. Four entrance doors are constructed in one side to permit entrance of the four drying trucks.

Air circulation is accomplished by means of a horizontal, top-discharge centrifugal fan capable of providing from 5,000 to 6,000 cu.ft. of air per minute at a velocity of 400 to 500 ft. per minute across the drying trays. The fan is provided with a shaft extending through the dehydrater wall so that the motor can be mounted outside. Volume and velocity of air can be regulated by changing pulley sizes.

Heat is supplied to the dehydrater by means of a fin-type steam coil. Experiments are being conducted with standard-type steam radiators and with a heating coil made up of ordinary 1- to 2-in. pipe to determine if these can be adapted to this purpose.

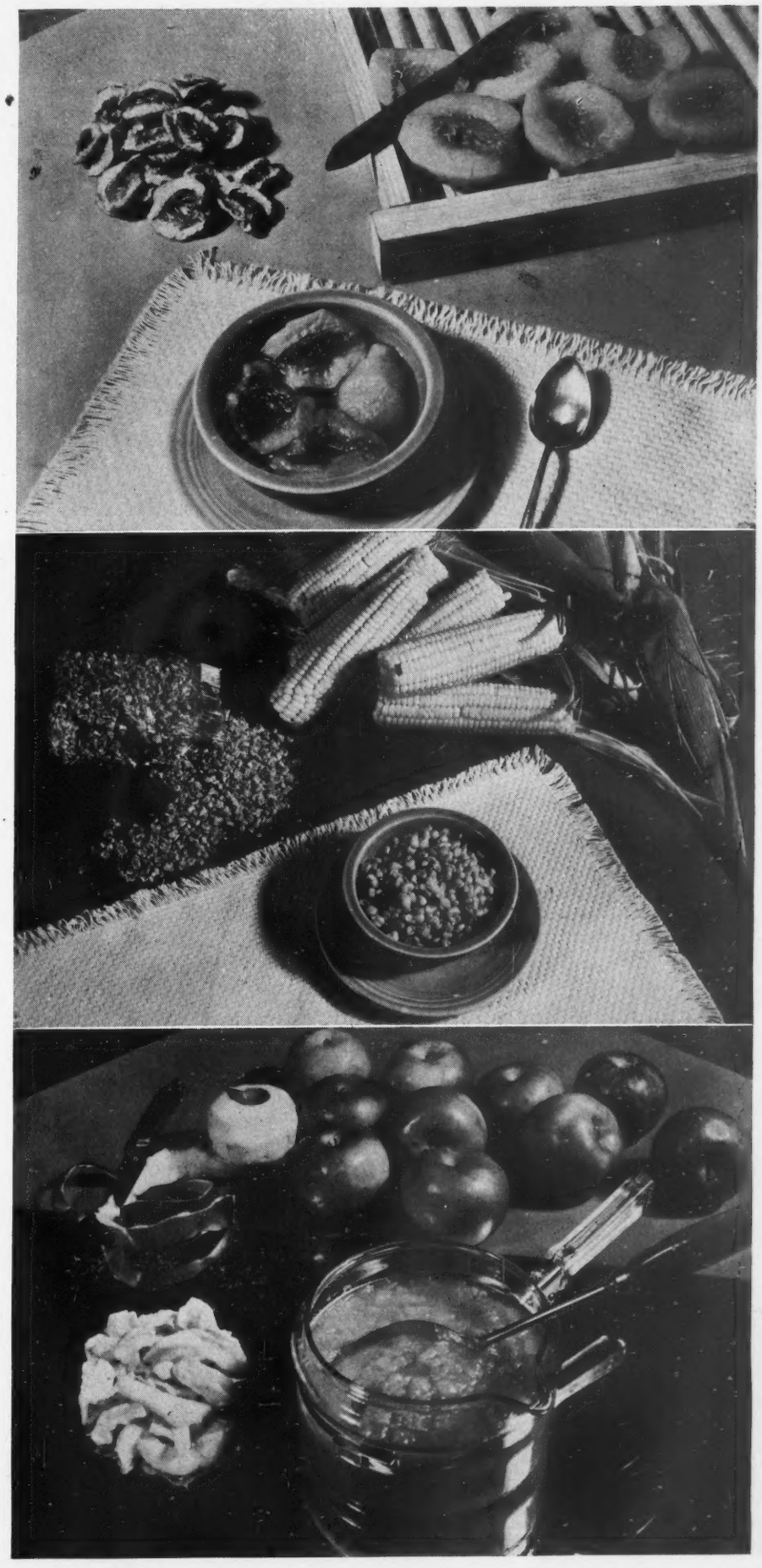
Dehydrater Controls

Temperature is controlled by a motor-operated steam valve that, in turn, is regulated by a dry-bulb thermostat, which can be adjusted to the required temperature.

Humidity is controlled by regulation of the intake and exhaust dampers. Both dampers are closed at the beginning of the dehydration period until the product is heated thoroughly to approximately the wet-bulb temperature of the air. In actual operation, it has been found that approximately 10 to 20 percent fresh air is all that is required. Manual operation of the dampers has been found sufficient when operating on a community scale, provided a hygrometer, placed on the exhaust side of the drying tunnel, is used for checking the temperature and humidity of the air leaving the product.

Capacity and Cost

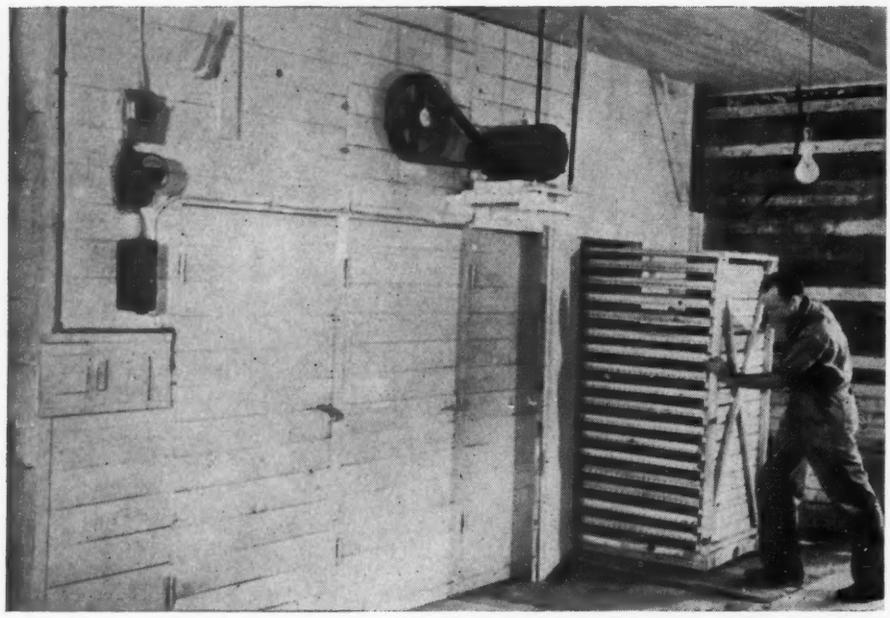
This dehydrater has a capacity of 50 bu. of prepared peaches. Capacities for other products, along with data on tray loading, weights of fresh and dried prod-



TOP—Peaches dehydrated in community dehydrater, showing sliced peaches on drying tray before drying at upper right, dehydrated peaches at upper left and the refreshed product at center.

CENTER—Sweet corn is cut from cob, dehydrated and packed in transparent bags (left). Refreshed product is shown in dish.

BOTTOM—Dehydrated sliced apples are shown at left and apple sauce made from product is shown in glass double boiler.



View of community dehydrater showing a truck load of trays being pushed into one of the doorways.

ucts, average drying times, and weights of water evaporated are given in Table I.

The approximate cost of the dehydrater, less labor and without steam boiler, is $502.70. The approximate cost per ton of capacity is $405, and the cost per square foot of tray surface is $0.70.

Research is under way in an attempt to further reduce this cost by substituting plywood for metal in the construction of baffles and fan housing, and at the same time reduce the quantity of critical materials used.

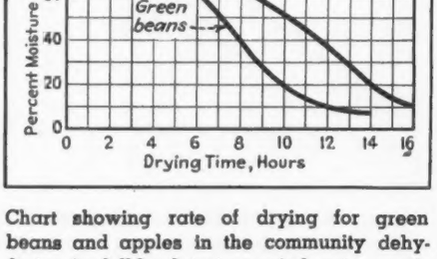


Chart showing rate of drying for green beans and apples in the community dehydrater in full-load tests carried out on unit installed at Clarkesville, Ga.

Operating Date

Detailed studies of operating characteristics and performance were made at the Clarkesville, Ga., plant. The capacities of this plant were approximately 85 percent of the capacities listed in Table I. During the period from July 28 to Oct. 15, 1942, when experimental data were collected, a total of 115 families used the dehydrating facilities for preserving from 18 to 20 different fruits and vegetables. Table II contains operating data collected during full-load tests on green beans and apples. The chart shows moisture content plotted against drying time and indicates the rate of drying.

The community acceptance of this method of food preservation, at the four installations made in community canning plants, has been good. Considerable interest has been shown by many communities throughout the Southeast in the installation of similar equipment.

It is felt that enough studies have been made on design of equipment for dehydration and on preparation methods to initiate a program for 1943. Packaging and storage studies are now being made. Information resulting from this research will be made available to prospective operators of community plants before the next drying season.

It is estimated that the following annual savings in metal, based on a plant packing an average of 41,900 equivalent No. 2 cans, can be effected by converting community canning plants to dehydration. (Basic data on metal requirements for tin cans and glass jars supplied by Container Section, Office of Civilian Supply, WPB.):

1. In comparison with canning in tin, 5 tons of tinplate (5.2 tons after the first year, as the steel investment in the plant will be retired) will be saved.

2. In comparison with canning in glass, over 1,040 lb. of steel used in lids will be saved. (Assume lid bands will be used three years.)

TABLE II—Full-load Tests of Community Dehydrater on Green Beans and Apples

General	Green Beans	Apples
Variety	Tender pod stringless	Stayman Winesap
Stage of maturity	Beans in pod, half mature	Firm to mellow
Market grade	A No. 1	Ungraded No. 2
Price per bushel	$1.25	$1.00
Number of bushels dried	32	31
Processing Procedure		
Preparation	Ends broken off and beans broken into several pieces	Hand peeled, cored and cut in sixteenths
Washing	Wash thoroughly in cold water	Washed before preparation
Treatment	Blanched in hot water for 10 min. (190 to 200 deg. F.)	Sulphured for 30 min. after placed on trays
Tray loading	1.5 lb./sq. ft.	1.83 lb./sq. ft.
Drying time	14 hours	16 hours
Drying temperature	145 deg. F.	145 deg. F.
Weights of Products		
Fresh product	968 lb.	1,550 lb.
Prepared Product	884 lb.	1,050 lb.
Prepared product after treatment	849 lb.	
Dry weight (total)	79.75 lb.	166 lb.
Dry weight per bushel	2.5 lb.	5.35 lb.
Moisture Content		
Prepared product	92.5%	87.5%
Prepared product after treatment	90.0%	
Dried product	6.8%	10.0%
Total Moisture Removed	769.25 lb.	892.0 lb.
Condensate Data		
Average coil pressure	11.8 lb.	16.7 lb.
Average lb. condensate per hour	117 lb.	133 lb.
Total condensate for test	1,523 lb.	2,132 lb.
Cost of Operation		
Power consumption (motor)	16.7 kwh.	18.35 kwh.
Total fuel (coal) used	528 lb.	558 lb.
Total water (condensate) used	182 gal.	256 gal.
Cost of operation* per lb. prepared product	0.36 cents	0.33 cents
Cost of operation per lb. dried product	4.0 cents	2.1 cents
B.t.u. and Boiler Horsepower Required		
B.t.u. output	130,260	148,456
Boiler horsepower	3.89	4.43

*Includes water at $1.50 per 1,000 gal., electricity at 4¢ per kwh., and coal at $8.50 per ton

TABLE I—Capacity of 50-Bu. Dehydrater for Various Products and Evaporation Data *

Material	Specific heat of material	Capacity: Fresh product Pounds Per Bu.	Capacity: Fresh product Pounds Bu.	Capacity: Fresh product Pounds Total	Prepared product Lb.	Prepared product Percent moisture content	Tray loading, lb. sq. ft.	Dry product Lb. total	Dry product Lb. per bu.	Dry product Percent moisture content	Average drying time, hours	Weight of water to evaporate Total lb.	Weight of water to evaporate Lb. per hour
Peaches (peeled)	0.92	50	50	2,500	1,700	89.0	2.36	212	4.24	11.8	16	1,488	93.00
Apples	0.92	40	50	2,000	1,225	87.5	1.70	175	4.37	12.5	12	1,050	87.00
Pears	0.91	38	56	2,128	1,225	87.0	1.70	180	4.74	11.5	12	1,045	87.00
Beans (green)	0.91	45	30	1,350	1,080	89.5	1.50	120	2.67	5.5	14	960	68.50
Okra	....	42	32	1,344	1,080	91.3	1.50	100	2.38	6.0	10	980	98.00
Corn (kernels cut from cob)	....	27	70	1,890	1,080	71.0	1.50	337	12.50	7.0	10	743	74.30
Carrots	0.87	28	50	1,400	1,080	90.5	1.50	108	3.86	5.0	10	972	97.20

*The above data are based on actual figures at the Clarkesville, Ga., dehydration plant.

Dehydration of Fruits Offers Important Wartime Advantages

By E. M. MRAK, H. J. PHAFF, C. D. FISHER * and G. MACKINNEY,
University of California, Berkeley, and * Dried Fruit Association.

The war emergency in food preservation requires a complete reconsideration of existing methods. Here is a case where an old time-tried method has been improved with astonishing benefits. Blanching and dehydration have produced a striking improvement in the product of the dried fruit industry

IN THE PAST the obvious advantages of dehydrating fruit have been outweighed by certain disadvantages, but the urgency of the war requires reconsideration of the whole problem. Fruit that is dehydrated may retain higher percentages of carotene (provitamin A) and ascorbic acid (vitamin C) than does dried fruit. Dehydration also effects important economies in labor, time and amount of equipment tied up, and dehydrated fruit can be produced with the color and translucency regarded essential by present trade standards.

Some of the advantages and disadvantages of dehydration, as compared with other methods of drying, will be discussed presently, as will recent work showing that acceptable dehydrated fruit may be produced. To provide a basis for comparison, we shall first review briefly the current commercial practice in California.

The fruits which are cut before drying include apples, apricots, nectarines, peaches and pears. It is convenient to separate these from fruits which are dried whole, namely prunes, grapes and figs. The three principal methods of drying are known in the trade as sun-drying, evaporation and dehydration. (Vacuum drying, still on a very limited scale, may be regarded for convenience as a subdivision of dehydration). Sun-drying is self-explanatory, and apricots, nectarines, peaches and pears have hitherto been dried almost exclusively by this method. Evaporation may be defined as drying by artificial heat, circulated only by natural draft, and apples are ordinarily dried in this way in California, rarely if ever in the sun. In dehydration, drying is also accomplished with artificial heat, but there is also mechanical circulation of the air.

The pretreatment varies somewhat, but ordinarily consists in washing (for pears), cutting, pitting or trimming, traying and sulphuring. If the fruit is to be sun-dried, the trays are spread in the sun for several days until about two-thirds of the drying has occurred, then the trays are stacked and the drying continues slowly in the shade. The time required varies from 3 to 21 days. Apricots in the cooler coastal areas, e.g., Aromas, dry very slowly and may require up to three weeks. If, on the other hand, the cut fruit can be dehydrated, the time required is usually less than 24 hours—a big saving in time and equipment.

Special War Problems

In some areas, notably northern California and Oregon, the weather is less suitable for sun-drying, and here fruit is grown either for shipment as fresh fruit or for raw material for the canning industry. Lack of transportation facilities and the shortage of metal containers for canning will force operators to turn to dehydration as a method of food preservation. In most areas the labor supply is inadequate, and if these problems were awkward in 1942, they will be even more acute in 1943. It is estimated that a smaller number of

Fig. 1. Appearance of sections of peach halves blanched in steam for various periods of time. Blanching times were, from top to bottom, 0, 3, 6 and 9 minutes. Sections at the left were treated with guaiacol and H_2O_2, whereas those at the right were not. Dark-colored areas at the left and light-colored areas at the right indicate underblanching.

manhours is needed per ton of fruit preserved by dehydration than by sun-drying. There has been an insufficiency of trays in some areas, and while the cycle of production in dehydration equipment is once in 24 hours, it is several days in sun-drying. Another war problem is the trend to lower moisture content, both for reduction of weight and for keeping quality on prolonged storage. This can be accomplished only by dehydration.

Sanitation

From the standpoint of sanitation, there is no question as to the superiority of dehydration procedures. The product from the dehydrater is free from the insect-infestation difficult to avoid with sun-dried fruits. (All dried fruits, of course, are subject to insect attack during storage, and must be properly protected to avoid this spoilage.) The dry-yard operator, however careful he may be, cannot prevent dirt particles and wind-borne microorganisms from adhering to the exposed fruit, whereas these difficulties do not arise in dehydration.

Standards and Color

Characteristically, sun-dried fruit is translucent and somewhat glossy in appearance, of uniform color (usually described as deeper), and the texture is softer than that of dehydrated fruit. The latter is opaque, dull in appearance, less uniform in color and of tougher texture. Such fruit falls in a lower quality grade and commands a lower price.

It is difficult at any time to trace the early history and foundations on which our standards rest. "Natural" color as used by Hilgard, 1884, referred to the slightly darker fruit which had not been sulphured. In this sense, the trend has been to a lighter more uniformly colored fruit obtainable by proper use of sulphur, best typified by the golden appearance of the sun-dried apricot. This in Hilgard's view was wholly artificial. His report, in 1890, referred to the "sickly tinted chemical-tainted product of the sulphur box." This is not to endorse his round denunciation, but rather to show that arbitrary standards, valuable though they may be in promoting uniformity and cleanliness, can in the course of time obstruct development unless placed on a sounder and more absolute basis. A great deal has been written about this "natural" color, and the necessity of exposing the fruit to the sun to fix or set the color. Heretofore, some exposure to the sun has been necessary to produce this effect. The dehydrated product frequently is indistinguishable from the sun-dried if, after sulphuring and before dehydration, the fruit has been exposed to the sun for a small part of the drying period. The same effect apparently can be obtained by using ultraviolet rays, as we were able to demonstrate experimentally by exposing sulphured fruit to an H-5 (G.E.) lamp for 2 hours.

The natural coloring matter of the apricot and the peach is carotenoid in character, and the carotenes present are potentially valuable as provitamin A. The color developed by the sun is not a natural color in the sense that it is due to pigments originally there. These pigments are, in fact, partially destroyed by the treatment. An amusing proof that the color is developed during the sun-drying or other substitute treatments is shown in some samples of peeled cling peaches. After dehydration, the fruit developed the golden color of the apricot to such an extent that our colleagues flatly denied that we had started with peaches of any variety known to them.

Obviously, the basis for rational standards in modern times depends on two factors, *sanitation and nutritive value*. Yet this latter aspect has never been considered either by the trade or by the consumer. Both have accepted or rejected the fruit primarily on its appearance prior to soaking and cooking. A simple test with translucent and opaque pears shows no difference in the final cooked product. (This depends to a considerable extent on the soaking procedure, whether in water, or in sugar solution.) The same test may be applied to peaches or apricots.

Requirements for Dehydrated Fruit

The sun-dried fruits have long been a staple product with the consumer throughout the world. That the public is guided by appearance is admitted even by Hilgard. It follows therefore that a satisfactory dehydrated product must meet these requirements:

1. It must equal in appearance (uniformity of color and translucency) the sun-dried product.

Fig. 2. Appearance of sections of pear halves after blanching in steam for various periods of time. Blanching times were, from left to right, 0, 4, 8, 12 and 16 minutes. Underblanched areas appear dull and chalky and are firmer than the blanched areas.

2. For keeping qualities, it must retain a high level of SO_2.
3. It should be equally nutritious.
4. Sanitation, a point already settled in favor of the dehydrated product.

We shall consider each of these points in turn.

Appearance. The appearance may be improved in one of three ways—first, by a combination of exposure to the sun and subsequent dehydration. This involves additional labor and is less satisfactory from the sanitary standpoint, so that no real solution has been obtained by this method. Secondly, the fruit may be artificially irradiated. Experiments made during the 1941 season indicated that infrared and visible light had no beneficial effect, but that a 2-hour exposure to a strong source of the ultraviolet accomplished the desired result. The third method, which we have discovered and set forth, involves steam-blanching prior to sulphuring.

It is difficult to explain why such radically different treatments produce these results. The temperature was carefully controlled in the chamber with the ultraviolet lamp so that no heating took place, and runs were made at

70 and 100 deg. F. (outside temperature). The infrared raised the temperature of the fruit to 140 deg. without causing translucency in the final product.

The answer would seem to lie partly in the chemical changes produced by the ultraviolet and by steam blanching and partly in the effect on cell structure in the fruit. The opacity of the dehydrated fruit permits reflection of the incident light only from the surface, so the color is lighter.

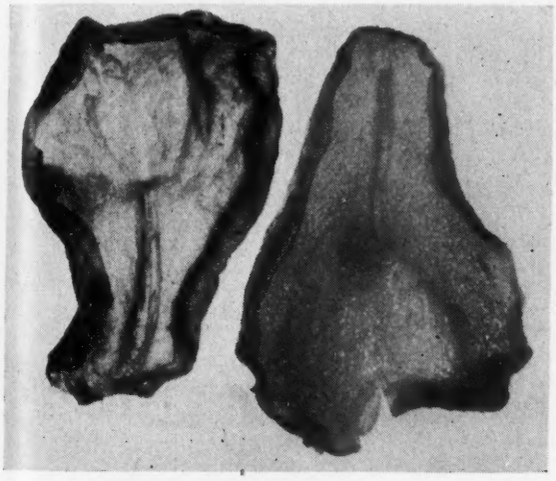


Fig. 3. Bartlett pear halves. Left, unblanched; right, blanched in steam 25 minutes. Unblanched sample is chalky and opaque. Steam-blanched is translucent.

Since bioassays have frequently shown losses of 50 to 70 percent in the carotene (provitamin A) content of acceptably colored sun-dried fruit (particularly apricots), and since the color of a cling peach can be made to simulate that of an apricot, it is highly improbably that the enhancing of color is due to natural pigment. Mackinney, Aronoff and Bornstein (1942) have shown that the dehydrated product may have as much, and even more, carotenoid than the sun-dried fruit. The effect of the ultraviolet and of blanching can be to cause an extremely mild incipient caramelization. Together with mechanical changes in the cell structure (the blanched product dries much more rapidly), these changes could combine to give the translucent effect, and the residual carotenoid, plus the caramelized sugar, gives the more intense golden color. Weast and Mackinney (1941) record the fact that a thoroughly blackened apricot, when moistened and exposed to bromine vapor, becomes golden-colored, virtually indistinguishable to the eye from a normally dried apricot, and obviously "natural" color is not involved there. While the above explanation as to cause is still in part conjectural, because of the difficulty of obtaining clear-cut proof, no other hypothesis has been advanced that fits the facts as well.

Long, Mrak and Fisher (1940) tried preheating in the dehydrater, with closed vents, but, although this reduced the drying time, it did not yield translucent fruit. At that time the blanching step was not tried.

Retention of Sulphur Dioxide. Long, Mrak and Fisher (1940) have shown that dehydration will improve SO_2 retention very considerably in areas where otherwise prolonged exposure to the sun would be necessary for adequate drying. Pears may even mold in the dry yard during cool foggy weather, an indication of severe loss of SO_2.

Chace, Church and Sorber (1933) reached the conclusion "that blanching has no advantage in reducing the sulphur dioxide retention and has the disadvantage of lowering the grade." At that time, the trend in industry was toward lower SO_2 levels because of uninformed opposition to its proper use. This trend has now been reversed as a result of the necessity of maintaining high SO_2 levels if quality is to be retained under adverse storage conditions. Consequently, they appear to have regarded blanching as a possible substitute for reducing the SO_2 level, rather than as a complementary treatment. Therefore, the advantages of blanching in making possible an acceptable commercial article by the use of dehydration, comparable with the sun-dried product, has not hitherto been appreciated.

Nutritive Value of Dehydrated Fruit. Analyses on fruits have been centered mainly on apricots and peaches. Only a limited number of observations have been made on pears. The criteria on which nutritive value is based have been limited to two—provitamin A (or carotene) and ascorbic acid (vitamin C). The sun-dried product, as purchased on the open market is generally very low in vitamin C. On the basis of some 40 to 50 analyses, our blanched dehydrated peaches and apricots are surprisingly high in vitamin C. The value for the fresh peach varies from 0.10 to 0.25 mg. per gram, and from 0.4 to 0.9 mg. for the dried product. Steaming alone tends to reduce the value only slightly, whereas in methods calling for exposure to the sun the losses are severe.

It should be added that, because ascorbic acid is so easily destroyed by improper handling, it is very easy to misinterpret the data. Slight delays in sulphuring the cut fruit, while other experimental trays are being blanched, for example, may have a disproportionate effect on results, so that while a given sample may be quite accurately assayed, unavoidable minor differences in the treatment may modify the answer more than the treatment itself.

Variability in the original material is also an extremely important factor, as shown by analyses on Blenheim and Tilton apricots. The latter, when blanched and sulphured, contained from 0.58 to 0.75 mg. of ascorbic acid per gram. An apparently comparable series of Blenheims varied from 0.11 to 0.15 mg. per gram. To check on this superiority of the Tiltons, more analyses were made of both, and although the Tiltons were higher, samples of Blenheims were obtained containing 0.29 and 0.43 mg. per gram, indicating that sample variability was fully as important as any treatment in determining the retention of vitamin C.

A few specific instances may be cited for Muir peaches:

	Ascorbic acid per gram (mg.)
20 min. steam, dehydrated	0.43
10 min. steam, sulphured, dehydrated	0.48
No steam, sulphured, dehydrated	0.22
No steam, no sulphur, dehydrated	0.10
Sulphured, sun-dried	0.09
20 min. steam, 2 days in sun, dehydrated	0.33

Carotene and ascorbic acid are well known for their sensitivity to oxidative systems, and prolonged exposure to air and light at temperatures over 90 deg. F. are particularly to be avoided. The sulphur dioxide gives protection at the higher temperatures reached in dehydration, and rapid reduction in moisture content during dehydration is additional protection. The oxidative enzymes are inactivated by the blanching. Insofar as our observations are concerned, therefore, the nutritive value of the blanched, dehydrated fruit is superior to that of the sun-dried product.

The Preferred Procedure

After washing (for pears), cutting, trimming or pitting, the fruit is placed on standard trays, 2x3, 3x6, or 3x8 ft., which are then passed through a typical continuous tunnel vegetable steam blancher. Longer blanchers are necessary than for those used for vegetables, owing to the longer time required for

peaches and pears.* Live steam should be injected from above and from below the moving trays. Fruit removed from cold storage should first be allowed to attain room temperature before cutting. Cold fruit causes excessive condensation of the steam, and apricots in particular will slab and stick to the trays. As already stated, the time of blanching will vary with the size, variety and general condition of the fruit. It is therefore advisable to have at least two size grades and to blanch those of a given size and maturity in a particular run.

It has also been found that the blanching requirement varies considerably with the blancher. Each operator must learn the characteristics of his own blancher. The range for blanching time and conditions for sulphuring are given in Table I.

The fruit should be blanched until it is cooked through, but not to the point where excessive bleeding occurs. Underblanched fruit will retain firm areas easily observed when the fruit is cut with a knife. Bartlett pears in particular tend to discolor owing to oxidase activity, whereas when properly blanched, the guaiacol test for peroxidase is negative (see Figs. 1 and 2). Peeled clingstone peaches require less time because of the heat treatment during peeling. Overblanched clings also tend to bleed and form slabs on dehydration.

Blanching Shortens Sulphuring

Owing to higher SO_2 retention, blanched fruits, should be sulphured for a shorter period than unblanched fruits, whether they are to be dehydrated or sun-dried. Also, it is necessary to control sulphuring more carefully, as too much sulphur at too high a temperature causes unnecessarily severe bleeding. As with the blanching operation, sulphuring varies with each set of operating conditions. The precautions in sulphuring, proper construction of sulphur houses, and sulphuring temperatures equally applicable to the present method have been fully discussed by Fisher, Long and Mrak (1942). In general for blanched fruit, the time is cut by one-third to one-half that required for unblanched fruit.

Long, Mrak and Fisher (1940) showed that dehydration greatly facilitated sulphur dioxide retention (see Table II taken from their bulletin). The sulphured fruit is dehydrated at the highest temperature that can be safely used, the critical temperature, above which noticeable breakdown takes place. Dehydration times and temperatures are given in Table III.

It will be noted in Table III that blanching greatly reduces the required drying time, in some cases, e.g., Lovell peaches, by as much as 50 percent. Unblanched fruit may caseharden, whereas this has never been observed by us with the blanched fruit. The properly blanched fruit was translucent, glossy in appearance and of good color when dried, while the unblanched fruit was opaque, dull and chalky (in pears) or light yellow in apricots and certain peaches. When clingstone peaches were peeled, blanched, sulphured and dehydrated, they closely resembled apricots except for their size. Upon resorption however, the halves regained their normal size, and were not readily distinguishable from normal canned clingstones in color. Blanched Tiltons attained a color so similar to the sun-dried Blenheims that they were distinguished only by the characteristic thinness of the Tilton halves.

Table I—Blanching and Sulphuring Requirements for Cut Fruits to be Dehydrated.

Fruit	Blanching time, minutes	Sulphuring conditions, % by volume	Time, hours
Apricots			
Tilton	1–3		1½
Blenheim or Royal	1–4		1½
Peaches (freestone)			
Elberta	6–20	2	2½
Hale	6–20	2	2½
Muir	6–15	2	2½
Lovell	6–15	2	2½
Peaches (cling)			
Midsummers			
peeled	6–12	3	2½
unpeeled	8–14	3	2½
Pears			
Bartlett	15–30	3–5	2½–3
Hardy	15–25	3–5	2½–3
Du Comice	15–25	3–5	2½–3
Nectarines	8–12	2	2½

Table II—Comparison of the Effect of Sun-drying and Dehydration on Retention of Sulphur Dioxide by Apricots (Aromas)

Treatment	SO_2 retention, p.p.m.	Percent increase in SO_2 retention of dehydrated over sun-dried	Retention ratio*
Sulphured with liquid SO_2 for 95 minutes at 4 percent concentration			
Freshly sulphured fruit	2,870	...	....
Sun-dried; spread 5:00 p.m.	520	...	0.18
Dehydrated	790	52	0.27
Sun-dried; spread next a.m.	600	...	0.21
Dehydrated	790	32	0.27
Sulphured under typical farm conditions			
Freshly sulphured fruit	1,418	...	....
Sun-dried	370	...	0.26
Dehydrated	778	110	0.55
Freshly sulphured fruit	1,820	...	....
Completely sun-dried	690	...	0.38
Sun-dried 24 hours	900	...	....
Dehydrated, after sun-drying 24 hours	1,190	72	0.65
Freshly sulphured fruit	2,394	...	....
Sun-dried	472	...	0.19
Sun-dried, after dehydrating 1 hour	520	10	0.22
Freshly sulphured fruit	2,600	...	....
Sun-dried	375	...	0.15
Dehydrated, after sun-drying 3 hours	1,810	375	0.68
Dehydrated	1,780	375	0.68
Freshly sulphured fruit	1,770	...	....
Sun-dried	420	...	0.24
Dehydrated, after sun-drying 3 hours	920	119	0.52
Dehydrated	1,050	150	0.60

* The retention ratio is derived by dividing the sulphur dioxide content of the dried fruit by the content of the freshly sulphured fruit. This necessitates no correction for moisture.

Table III—Temperatures and Times For Dehydration of Cut Fruits

Fruit	Dehydration temperature	Dehydration time, blanched	Dehydration time, unblanched
Apricots			
Blenheims and Tiltons	150	6–8	8–9
Peaches			
Elberta, Hale and Muir	150	16–18	18–24
Lovell	150	10–12	18–24
Midsummer (clings)	150	10–12	12–14
Pears			
Bartlett	160	24–28	[28–38
Hardy and du Comice			
Nectarines	150	8	10

Inspectors Impressed

Various Federal and State inspection agencies and industrial operators have examined blanched dehydrated fruit processed by this new method. Opinion has been unanimous that the blanched fruit would meet the present trade standards for high quality fruit, whereas the unblanched dehydrated samples would not.

This new method makes it possible to use existing prune and grape dehydration facilities for drying cut fruit.

In succeeding articles we hope to discuss additional problems involving keeping qualities and the factors concerned therewith.

Anyone desiring to use the method should contact the University of California at Berkeley.

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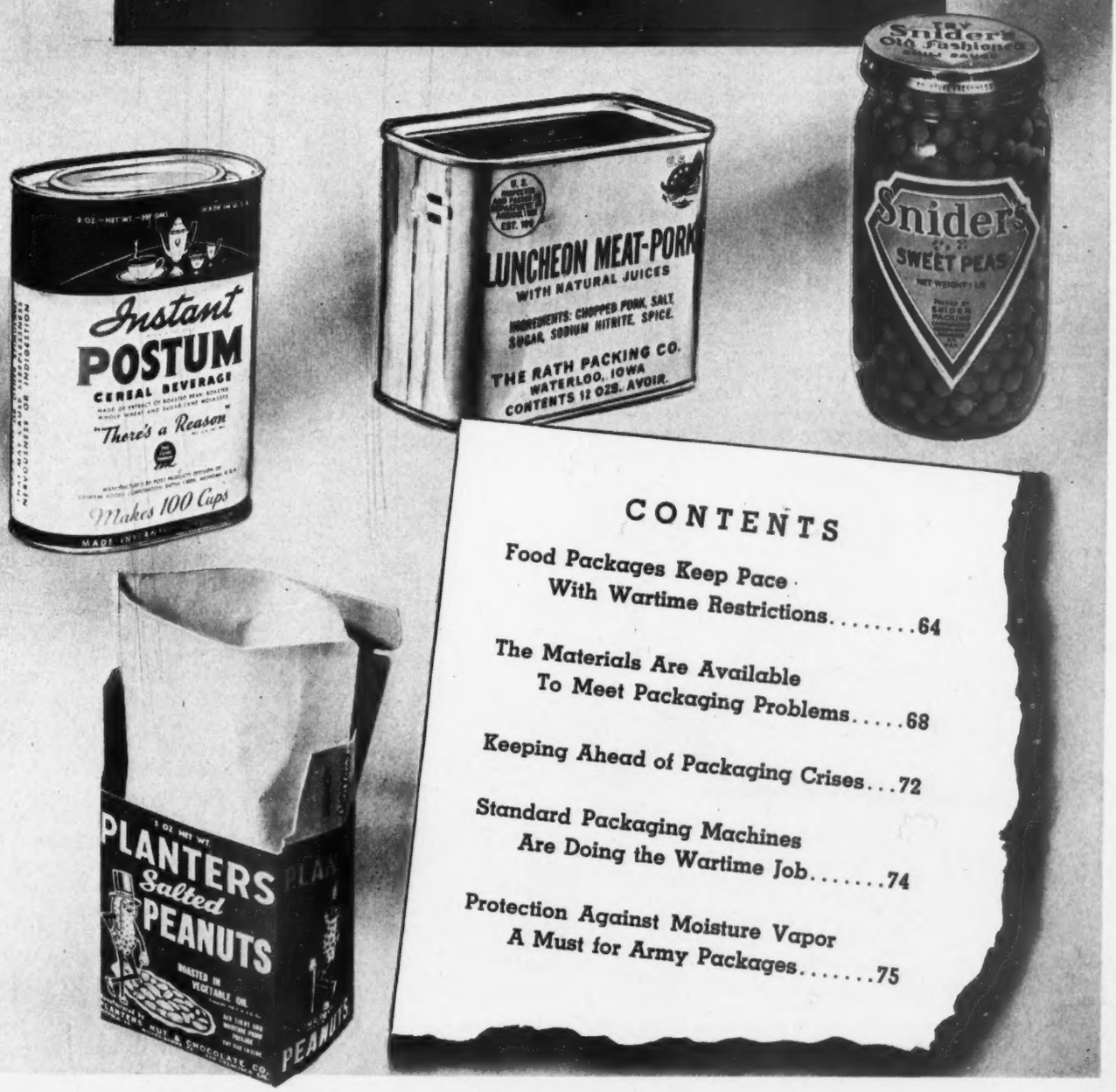
* Cabinet type blanchers may be more practical for these fruits.

Pictured on this page are a few of the many new packages developed to solve wartime problems of packaging foods. Containers of these types and other new ones are discussed in the following pages.

WARTIME TRENDS IN FOOD PACKAGING



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Food Packages Keep Pace With Wartime Restrictions

By ELIZABETH SHAW, Assistant Editor, "Food Industries."

Critical shortages of tin, aluminum, metal foils and rubber have forced drastic packaging changes in the food industry. What some of these changes are, and the problems involved in changing to a new package, are discussed in this article

ONE of the first packaging changes, and possibly the most outstanding one, caused by wartime restrictions on metal has been the swing from tin containers to glass jars. Foods of all varieties, including fruits and vegetables, spiced ham, vegetable shortening, malt sirup, cranberry sauce and coffee, formerly packed in hermetically sealed tin containers, are now visible on the grocer's shelves in glass packs of a fairly standard design. Many of the new dehydrated soups, Maxwell House coffee, Del Monte fruits and vegetables, Borden's Hemo, Nescafé, Underwood deviled ham, Heinz baked beans and Golden Blossom honey are among familiar brands now in glass pack.

The chief problem with glass containers for food packages has been to find substitute materials for the tinplate caps so hard to obtain. Black plate and enameled black plate caps and fiber and plastic caps are being used by various companies. Procter and Gamble's Crisco is now marketed in glass pack with a heavy paper cap, as are Lever Brothers' Spry and General Foods' Maxwell House coffee.

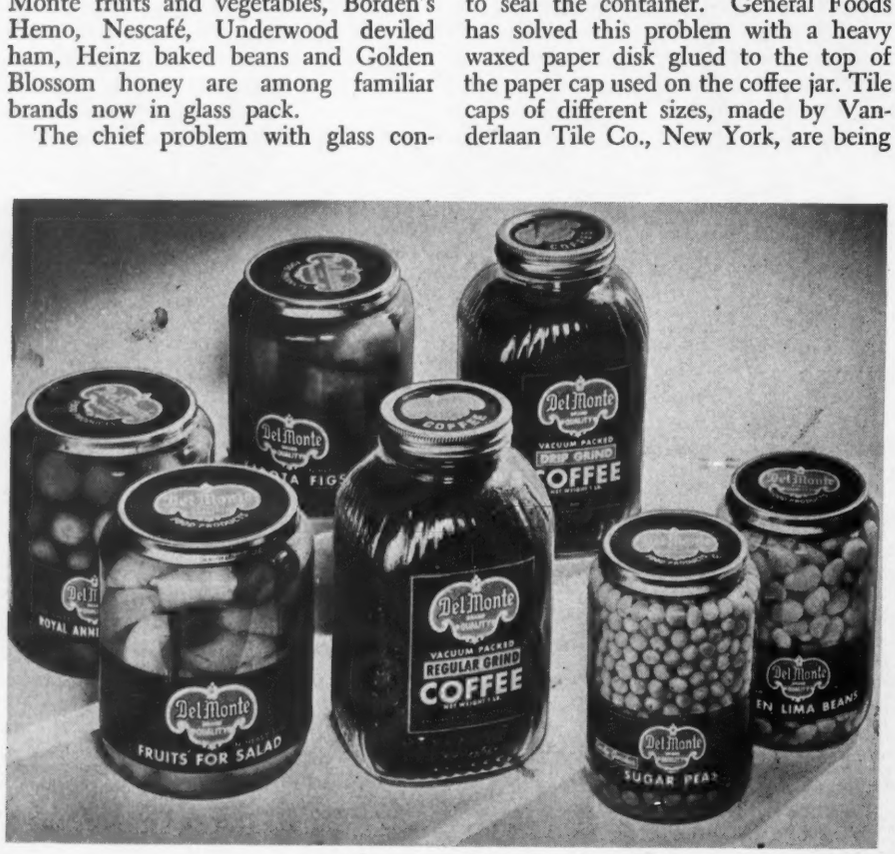
Another obstacle to this method of packaging foods in glass has been the shortage of latex sealing rings, needed to seal the container. General Foods has solved this problem with a heavy waxed paper disk glued to the top of the paper cap used on the coffee jar. Tile caps of different sizes, made by Vanderlaan Tile Co., New York, are being used experimentally by some companies.

However, despite the difficulty in obtaining closures, the accelerated use of the glass pack has given it a much more prominent position in the food packaging industry.

Poultry packers who prior to the war packaged their products in latex bags have also been forced to seek substitute materials. Jill's Poultry Farm, Kenner, La., producers of broilers and fryers which they dress, draw, pack individually and quick freeze, pack about 150,000 birds annually. The company's supply of latex bags was exhausted in October, 1942. While waiting for its order of cellophane bags, No. 300 MSAT, to be used as a substitute, the company had to quick freeze its products in cartons without protective wrapping. The new cellophane poultry bags are filled by hand and heat sealed. They are moistureproof and moisture-vapor proof, airtight and greaseproof, but a "fairly high-cost" package. In making the change the company had to alter machinery, packaging, processing and materials handling, and the new packing operation requires more labor than the old method.

Pliofilm, Goodyear Tire and Rubber Co.'s rubber hydrochloride-base film, is another wartime casualty, now diverted from fruits, vegetables, coffee, cheese and perishable foods to airtight containers for airplane engines and other military needs. Food companies who formerly packed their products in Pliofilm or similar materials with a rubber base are hastily experimenting with substitute materials. The research laboratories of Borden Co. have developed a new 5-lb. package for processed American cheese, replacing the old package, a rubberized coating on cellophane. The new package is a waxed coating on cellophane made by General Felt Products, Brooklyn, N. Y., and Shellmar Products, New York, attractively printed in red and blue.

Because of the tinfoil shortage, Borden has developed a ½-lb. cheese package of laminated wax-coated cellophane. Scarcity of metal foil also has been a bottleneck to manufacturers of bever-



Many foods have gone from tin to glass pack. Some coffee manufacturers are using glass pack with paper caps.

ages, particularly Canada Dry Ginger Ale, Inc., which has been forced to eliminate the aluminum foil from the necks of its bottles. Canada Dry and other companies have gone to larger size bottles because of the rationing of crowns.

Henry Heide, Inc., New York, which is packing a synthetic lemon juice powder for use in Army rations, experimented with lead foil but is now working on an order of 40,000,000 packages for the Quartermaster Corps in laminated cellophane 300 MSAT, 18 lb. wax per ream, which meets QMC specifications. The company has geared production to 100 packages of the "jungle ration" per minute.

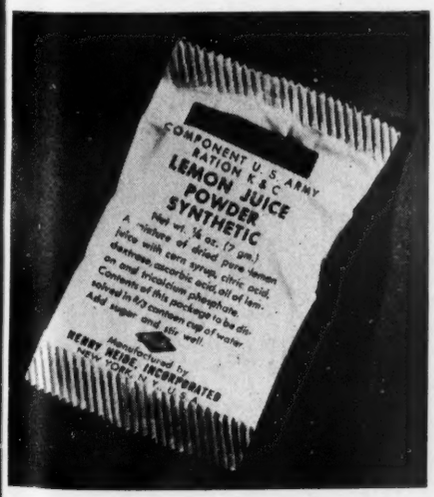
However, many food companies are unable to get quantities of cellophane, now in high demand for Army and Lend-Lease packaging. American Cone & Pretzel Corp. and the Doughnut Corp. of America both report great difficulty in obtaining the material. Doughnut Corp. has eliminated the cellophane window in its carton, replacing it with a reproduction of the doughnut directly on the paperboard.

Hershey Chocolate Corp. not only had to find a substitute for foil in its candy bar wrappers, but has spent months developing a suitable substitute for its tin container of breakfast cocoa. The first change found the ½-lb. cocoa in a paperboard carton with an oval friction-type tinplate cap set in the paperboard lid of the container. A blackplate cap later replaced the tinplate cap, and now the cocoa carton is appearing on the market with a heavy fiber cap of the same design.

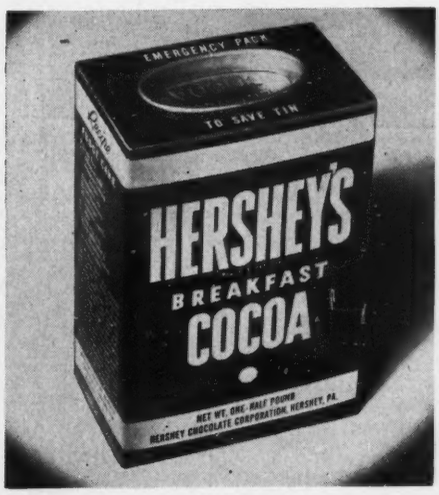
As far back as 1939 Rumford (R. I.) Chemical Works saw the need to change its baking powder can from metal to fiber, and the change was completed nearly a year ago. The company first began to work on the substitution of fiber bodied containers to save weight and cost. A package was designed that could be filled and closed on the existing packaging lines, and while there were many difficulties to be met in effectively rolling a metal end onto a fiber body, these were gradually overcome and one of the Rumford plants was converted to fiber body containers in the summer of 1940. When it became evident that tinplate would be scarce, plans were made to put the entire line into fiber bodied containers and development work was done under normal conditions without the need of carrying through conversion in rush fashion with inadequate changeover equipment, which has held up production in other companies. The Rumford baking powder container is a chipboard can with black plate ends, and a tinplate friction cap which slips over a rim around the opening in the top of the can.

Chr. Hansen's Laboratory (The Junket Folks) recently completed a changeover from tin to a paper package for Junket Rennet Powder in the 1-lb. size. The new package is wrapped in laminated glassine, sealed with wax, replacing the tin can with the screw cap. The new package has been found very satisfactory in its resistance to moisture, moisture-vapor and vermin. The cost is lower than that of the tin cans previously used, and existing ma-

Paper caps used on glass jars of Spry have inside Pliofilm "safety seal."



Laminated cellophane envelope for synthetic lemon juice powder.



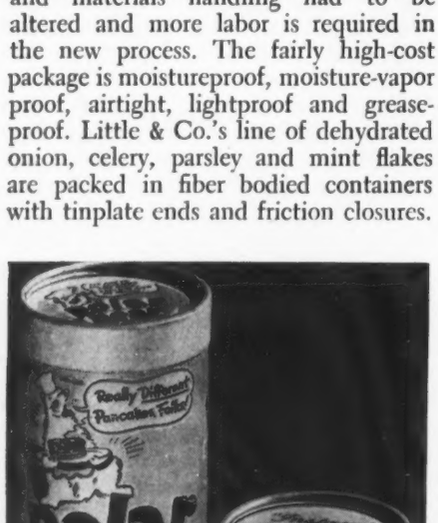
"Emergency pack" of fiberboard with tin friction cap, for cocoa.

Paper package wrapped in laminated glassine, sealed with wax.

Paperboard carton replaces tin for bouillon cubes.

chinery could be used for the new packaging operation without alterations. Practically no change in labor was required.

Little & Co., Chicago, has replaced its tin can for dehydrated sweet potatoes with a new package made of foil, kraft and fiberboard, filled and closed by machine and heat-sealed. Because the potatoes are packed for the Army and had to meet QMC specifications, several problems were involved in making the change; machinery, packaging and materials handling had to be altered and more labor is required in the new process. The fairly high-cost package is moistureproof, moisture-vapor proof, airtight, lightproof and greaseproof. Little & Co.'s line of dehydrated onion, celery, parsley and mint flakes are packed in fiber bodied containers with tinplate ends and friction closures.



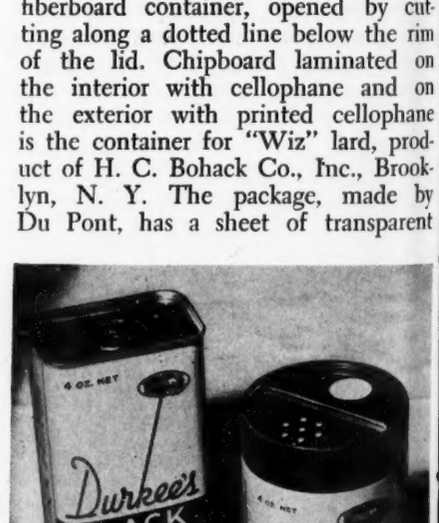
Cylindrical paperboard container for flour, cereal, powdered beverages.

Several types of food products formerly packed in tin have found their way into a fiberboard or paperboard container of some sort. Mint Bubblets, Chee-Wees, Peanut Flakes, and other confections of Elmer Candy Co., New Orleans, La., formerly marketed in a 7-oz. tin container with a key opener, are now sold in a heavy waxed paper carton made by Sealright Co., Fulton, N. Y., which keeps product identification by using the same shape and a similar lithographed label. A rectangular paper carton replaces the former round tin container for Maggi's bouillon cubes, but the familiar red and yellow colors are retained in the new package, and the cubes are still individually wrapped in cellophane with a printed paper band.

Wilkins coffee, roasted and packed by John H. Wilkins Co., Washington, D. C., one of the first brands to go into paperboard in the tin conservation campaign, is now appearing in a 1-lb. carton designed by Robert Gair Co., Inc., to resemble the former tin. Atmore's plum pudding, processed by Atmore & Son, Inc., Philadelphia; Bakón Yeast, product of Bakon Yeast Inc., New York; and Famous Ginger Snaps and Chocolate Wafers, made by National Biscuit Co., are examples of the products now packed in paperboard containers which preserve product identification.

Faced with the need for conserving critical materials, Myles Salt Co. has developed a unique pouring spout made entirely of paperboard and so designed that it operates exactly the same as the old familiar aluminum spout. It is manufactured by Container Corp. of America. Planters peanuts are one of the products now packed in a prelined container, a Thermophane bag within a paperboard carton. Corn Products Refining Co. is packing Mazola in a jar within a waxed container. Atlantic Coast Fisheries Co. has developed a new paper package to replace the tin containers formerly used for fresh fillets. Jewel Tea Co.'s dessert mixture is sold in an all-fiber container instead of the old metal-top and bottom can. The same company's coffee has always been made available to the public in paper bags, and the one metal container was changed first to black plate, then to a multicolored pique coffee bag and later to a one color kraft bag.

Manufacturers of lard and vegetable shortening have generally adopted heavy waxed containers to replace tin for their products. Capital City Products Co. is using new 1-lb. and 3-lb. cylindrical waxed containers of heavy paperboard manufactured by Sealright Co., Fulton, N. Y., for its King Taste vegetable shortening. Sealright is now working to perfect a liner that will hold the product during extreme hot weather. The one drawback to the container, according to Capital City Products Co., is the cost of the labor needed to pack it, as the operation is practically all done by hand. The new victory package for Cream White vegetable shortening manufactured by Tri-State Refining Co., Memphis, Tenn., is a cellophane-lined airtight fiberboard container, opened by cutting along a dotted line below the rim of the lid. Chipboard laminated on the interior with cellophane and on the exterior with printed cellophane is the container for "Wiz" lard, product of H. C. Bohack Co., Inc., Brooklyn, N. Y. The package, made by Du Pont, has a sheet of transparent



Tinplate shaker-type containers have been replaced by fiberboard.

Vegetable shortening and lard convert to heavy waxed containers.

Liquid-tight paper cup containers are widely used today.

cellulose film placed in the top of the package, held in position by the metal rim which crimps over the container walls.

Rather similar to the lard containers are cylindrical paperboard packages, without the wax coating and inner liners, for foods requiring less protection than the shortening products. Pancake flour, cereals, vitamin foods and powdered beverages, such as Nestlés cocoa, are now available in these containers with a simple paperboard lid which slips over the top of the can. These are also made by Sealright Co.

Both here and in Europe for several years the liquid-tight paper cup container has been used for a few foods, including ice cream, cheese, jams, jellies, sirups, meats, popcorn and dried products. Now cup containers are being used much more extensively. At the recent exhibit of the Technical Association of the Pulp and Paper Institute, cup containers for honey, bulk sausage, cottage cheese, hamburger steak, hog casings and dog food were on display. Some of the products are shown in the accompanying illustration.

Frozen food packages have been least affected by wartime shortages, although some new designs have recently come on the market. Prelined cartons or a cellophane wrap within a cardboard box are standard packages. Arvey Corp., Chicago, has perfected an "R-V Rapid-Freeze" leakproof food container for liquid and semiliquid foods that is made without use of vital war materials. It is of seamless, one-piece construction, a durable waterproof material whose strength and rigidity, it is claimed, are not affected by moisture or freezing, and the material and design facilitate rapid freezing.

Pet Dairy Products Co., Johnson City, Tenn., Luick Ice Cream Co., Milwaukee, and other firms are using a new ice cream and sherbet container, Nest Pak, developed by Menasha Products Co. A full single flap covers the package contents, eliminating the possibility of the contents spreading above the flaps when closure is made. This feature, plus the three other cover flaps, checks the tendency of the ices to "bleed" and discolor the package when defrosting.

Dehydrated foods, in addition to these packed under Army and Lend-Lease specifications, are for the most part packed in some type of paperboard carton, moistureproof and greaseproof cellophane or glassine envelopes. Because the production of dehydrated foods on a large scale is a relatively new development, much of the experimental work in packaging was carried on under wartime conditions and few packages require restricted materials. Manufacturers who first began packing in tin or Pliofilm or metal foil switched to fiberboard, waxed cartons or cellophane, and in some cases glass pack. Borden Co., which is packing dehydrated soups for the Army, is using a specially constructed Thermophane heat-sealed bag enclosed in a paperboard carton. Carrot juice cocktail, processed by R. D. Ridenour Sales Co., formerly put up in tin cans, is now packaged in a Du Pont cellophane envelope that is moistureproof and airtight.

Tinplate shaker-type containers holding such products as spices, pepper and cheese, have been replaced by all fiber-containers or by fiber with black plate ends. Borden's grated Italian-style cheese is packed in a fiber shaker with a paperboard disk in the top which can be turned so that the contents will pour out. Illustrated on these pages are the old and new containers for Durkee's black pepper.

Swiss cheese with sauterne wine added, processed by Red Rooster Foods, Chicago, is one of the many products now packed in stoneware crocks, formerly used only for the luxury trade. Stoneware crocks are now used for sirups, jams and jellies, meat products and delicacies. Chester County scrapple, manufactured by A. C. Roberts, Kimberton, Pa., last year marketed in a tinplate loaf pan with a cellophane liner, is now sold in a printed wrap of Lumarith Protectoid, product of Celanese Celluloid Corp. Paper loaf pans for meat products are now used extensively by meat packing companies, including Armour & Co., Kingan & Co. and Cudahy Packing Co. These were designed by Sutherland Paper Co., Kalamazoo, Mich., and are made of heavyweight stock specially treated with a solution which enables them to withstand higher temperatures than permitted by ordinary paraffin or wax.

Shortage of metal shipping containers has forced many companies to convert to corrugated boxes. Hoenshel Fine Foods, Sandusky, Ohio, has adopted a corrugated container of one-piece construction, readily set up for easy packing, and no stapling or stitching is necessary. Double-thickness ends and sides provide extra rigidity and protection. A corrugated cookie container used by Sterling Cake Co., Brooklyn, N. Y., and made by Hinde & Dauch Paper Co., is of die-cut construction, with a center-hinged lid which opens to reveal the contents.

To save strategic materials, multiwall paper bags are being more extensively used as shipping containers by manufacturers of salt, sugar, flour, potatoes and other staples. Fifty-pound multiwall bags made by Union Bag & Paper Corp. are used by F. L. DeZauche and Son, Opelousas, La., to ship sweet potatoes, and the company reports that its shipments arrive in perfect condition. Companies packing for Lend-Lease, such as Citrus Concentrates, Inc., Dunedin, Fla., are using the V-1 type of package, a sleeve over a solid fiber carton. The sleeve is strapped for extra strength, and is a standard container for Army or Lend-Lease shipments.

The Materials Are Available To Meet Packaging Problems

BY GRACE HIGHTOWER, Assistant Editor, "Food Industries."

Although many of the time-tested packaging materials are not now to be had in suitable quantity for civilian foods, there are others to take their place. Enough has been learned about substitutes to meet the emergency

EVEN in war the civilian must eat, and if he is going to eat, his food must be preserved and protected. Food for civilian use, however, need not be packed so that it can be shipped to the arctic or to the tropics, or thrown overboard on a lonely beach at dusk. The elaborate protective packaging required for the armed forces is only one side of the present packaging picture. For the domestic market there is the old problem of doing the best you can with what you can get.

Recent revisions of WPB orders M-81, M-104 and P-140 have clarified the food packing situation to the point where attention can be centered on essential developments, particularly in the requirements of pulp and paper products.

Metal Cans

Tinplate will, and should, go largely to the fighting forces. The present hot dip coating of 1.25 lb. is about the minimum that can be used with reasonable safety for many foods, and heavier tinning must be allowed for some. Electrolytic plate can be soldered on the conventional can making equipment, so that rapid production of cans is possible. The 0.5-lb. coating gives sufficient protection for many of the less corrosive processed foods. Chemically treated plate, bonderized and enameled, has definite limitations both in resistance to corrosion and in adaptability to fabrication methods. M-81 requires that electrolytic plate, or electrolytic ends with hot-dip bodies, be used wherever possible, to the extent that electrolytic plate is available, and specifies chemically treated plate ends with electrolytic can bodies for a few vegetables and some meat products.

Experience with wartime tinplate has shown that extra precautions must be observed by the canner, because rusting is a serious difficulty with these cans. The program has developed so fast that it has not been possible to establish definite limiting conditions for their use with foods for which they are suitable.

Glass Containers

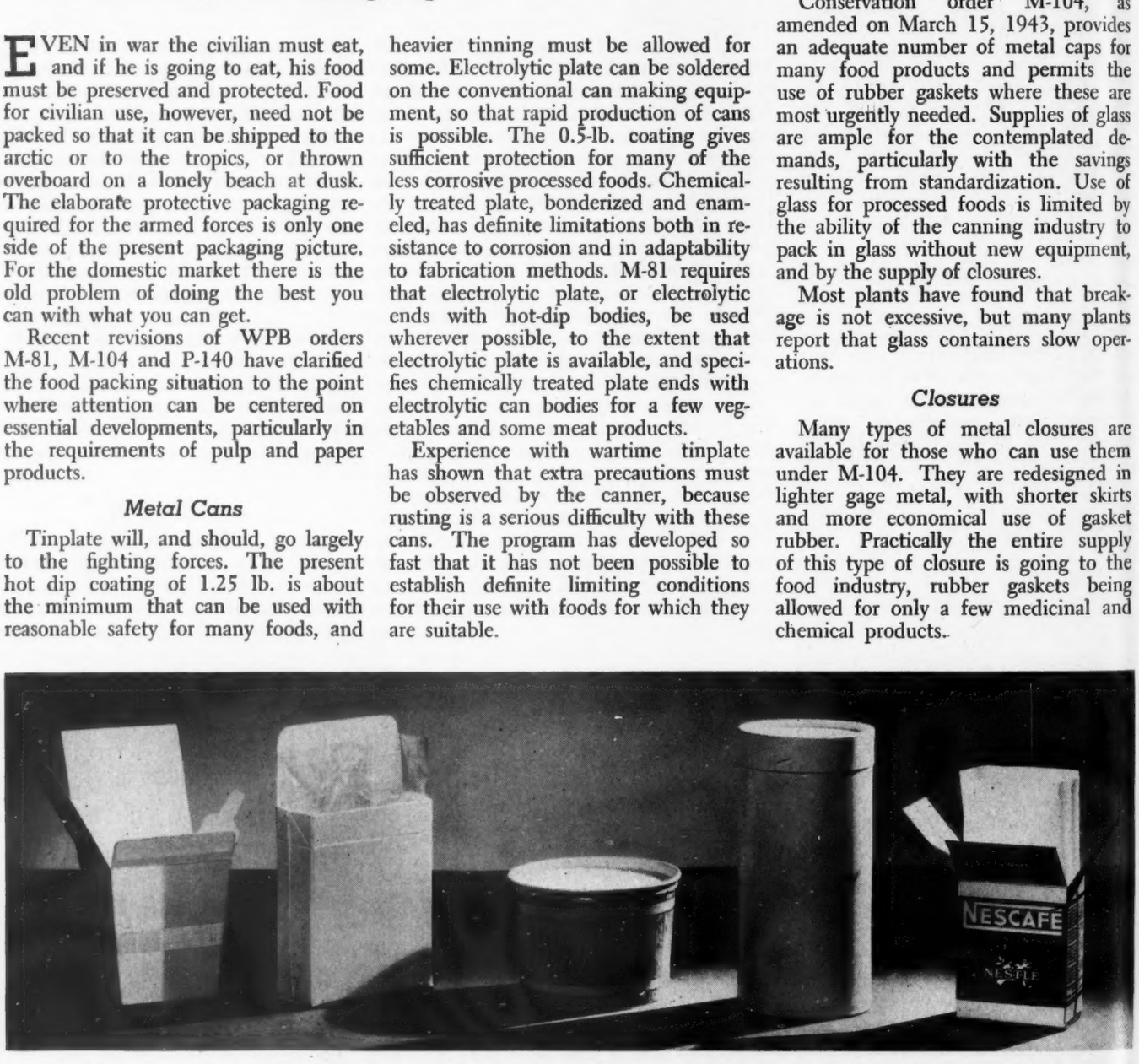
The glass container limitation order, L-103, is scheduled for revision in the near future. Container standardization under this order has already resulted in marked savings in closure metal.

Conservation order M-104, as amended on March 15, 1943, provides an adequate number of metal caps for many food products and permits the use of rubber gaskets where these are most urgently needed. Supplies of glass are ample for the contemplated demands, particularly with the savings resulting from standardization. Use of glass for processed foods is limited by the ability of the canning industry to pack in glass without new equipment, and by the supply of closures.

Most plants have found that breakage is not excessive, but many plants report that glass containers slow operations.

Closures

Many types of metal closures are available for those who can use them under M-104. They are redesigned in lighter gage metal, with shorter skirts and more economical use of gasket rubber. Practically the entire supply of this type of closure is going to the food industry, rubber gaskets being allowed for only a few medicinal and chemical products.



Typical paper packages: An ice cream carton for temporary use, two folding boxes with liners (cellophane and Thermophane), a spiral-wound can and a waxed cup.

Salad dressing, peanut butter, malted milk, chocolate sirup, honey and spices are among the food products which have in the past used a metal cap with an impregnated or coated paper disk. These products are listed at present to be packed in glass with paper-lined metal caps, the only difference being that the caps will be chemically treated (bonderized) black plate instead of tin.

Non-metallic Closures

The limitation orders provide a sort of gigantic game of "going to Jerusalem,"—either you get a chair, and a metal allotment, or you are out and "go into paper."

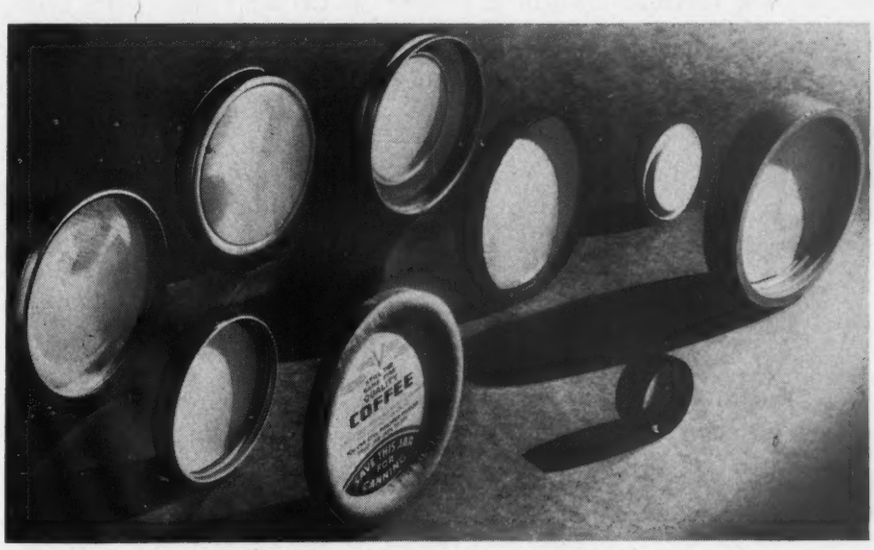
When metal is not permitted for closures, the question of substitution is still without a proved answer. The "finish," that is, the top, of a glass jar or tumbler is always somewhat irregular. Metal and rubber would accommodate this irregularity, within customary commercial tolerances, but molded pulp or plastic closures can not be made with the necessary flexibility.

Molded plastic caps are restricted both by limitations on raw material and on manufacturing equipment. They are now being used almost entirely by drug and cosmetic makers, and the available output of the entire industry is not enough even for those. Wood and ceramic materials are being advocated for cosmetics, where price is not the deciding factor. So far they have not gone beyond the experimental stage for foods.

A number of paper or molded pulp caps are now developed to the point where they are being given market trials, and others are in process of development. There are inherent disadvantages in such closures. Besides the lack of accommodation to tolerance in jar finish, cellulosic caps are not impervious, and a liner must be provided which contributes to the sealing properties. Also, cellulosic materials which are stiff enough to be put on by machinery cannot adapt readily to wide variations in atmospheric temperature and pressure as the tin and rubber closures did.

In spite of these difficulties, a number of clever paper closures are now available. One company has announced a thermoplastic, moisture-vapor-proof coating which seals and protects the paper cap, and another has a laminated cellophane cap sealed with thermoplastic. A familiar type of milk bottle cap is now made of laminated cellophane, with added stiffness due to an inset disk, and is in use on still beverages and on coffee jars.

At least two manufacturers make impregnated, threaded paper caps in the 63-mm. size, which can be handled on regular screw capping machinery and which are claimed to stand up under shelf conditions for periods approaching the normal shelf life of the products, both forming the actual seal by means of a permanently tacky surface on an inset chipboard disk. This closure will hold a vacuum. It can be made at costs not out of line with metal closures.



Closures which may be used with glass, made of metal, paper, molded plastic and tile.

Synthetic Gaskets

M-104 permits rubber gaskets for a number of products which were expected to be forced to use substitutes, although suitable substitutes were not available. Several noncritical gaskets have been developed, but in general they have not been satisfactory. One type is in use in a small way and may possibly be developed further. It is said not to flow as a top seal at 275 deg. F. for 40 minutes, and to hold a vacuum. Flowed-in gaskets have been tried, held in by the design of the closures, but none seem to have reached actual production and use. One or two which did show promise have been withdrawn due to changes in the raw materials situation.

Crown Closures

New crown closures for carbonated beverages and for beer can be made only of rejects and electrolytic "waste-waste," under M-104, except for those which were already lithographed or in process of manufacture before December 1942. Old tin and black plate crowns are being reformed, provided with new cork liners, sterilized, dried and repainted, but the process is expensive and unsatisfactory. Plastic crown closures have been developed, but they will not remain tight under the pressures which are encountered during shipment and distribution.

Shipping Containers

In preference rating order P-140, issued February 24, 1943, WPB defines a shipping container as a box, crate, case, barrel, keg, kit, pail, tub, drum, basket or hamper, of wood or corrugated or solid fiber and which is used as an outer container for the delivery or shipment of materials.

Containers for a few civilian foods are given an AA-3 rating, and those for most processed foods are AA-4. The former list includes fish, fresh meat, dried apples, apricots and peaches, fresh fluid milk and a list of 16 fresh fruits and vegetables, while the AA-4 list includes canned, dried, frozen and preserved foods, poultry and poultry products (including shell and dry eggs), shortening and edible oil, two fresh fruits and 24 vegetables, and dairy products not otherwise listed. Fresh fruits and vegetables, not elsewhere listed, and beverages, get containers on AA-5. AA-1 rating is given to containers for shipment or delivery of certain subsistence items for the Army, AA-2-X for foods set aside for purchase by the government agencies and for "controlled meats." Only in list 2 (AA-2-X) is there any mention of storage in the containers.

Export cases have been the subject of much cooperative development. In our early experience with Lend-Lease shipments, wooden cases were specified. These have the physical strength required, but wooden boxes could not be furnished rapidly enough. Fiberboard had to be made weatherproof so that it, too, could be used. Weatherproofing, as here used, means that the fiberboard itself is protected from water pene-

tration so that structural strength is maintained and the box can continue to hold itself and its contents together.

There are several ways to do this. An asphalt dip after the box is sealed will furnish a continuous external water barrier. Insoluble adhesives for use in laminating are now made which show no separation between plies after as much as seven days immersion in salt or fresh water, and show no deterioration when subjected to temperatures within the range from -20 to 130 deg. F., with 0 to 90 percent relative humidity. Fiberboard, whether solid or corrugated, laminated and sealed with such an adhesive will retain its strength under long periods of immersion or when left unprotected in rain and mud. It is necessary in sealing the case to provide a moisture-proof seal over the cut edges of the fiberboard to prevent water penetration.

Some special types of containers are used both for shipping and for storage. For instance shell eggs are stored in containers for periods up to at least nine months. Considerable strength is required in the cartons, since they are piled as many as nine high. Under these conditions the ordinary weatherproof solid board will eventually soften and fail. One special type of board has been developed which is entirely satisfactory, but with the expected large holdings of shell eggs it will be necessary to develop additional sources.

Order P-140 does not make clear the status of such containers. It does list certain commodities for which better ratings are granted when they are shipped without inner wrapping or packaging in containers having minimum volumes ranging from 5 to 30 gal., depending on the commodity. For butter the minimum is 10 lb.

Multiwall Bags

Multiwall bags have been used for certain heavy chemicals and for flour for many years, but recently there has been a great increase in their use for other products. The present restrictions on fiberboard and wood shipping containers and the scarcity of burlap will give multiwall bags added importance.

These bags are usually in 25- to 100-lb. capacity, made up of from three to seven layers of heavy kraft paper assembled in such a way that each layer carries part of the load and adds to the strength of the whole. The bottom is stitched. The top may be left open for filling and then sewed or stapled, but for many products which are free flowing the bags are closed in the factory except for one corner, where a "valve" is left for filling. Valve bags have the advantage of requiring no closing equipment, the valve being so designed that the weight of material in the bag will make a tight closure. Filling apparatus for the valve bags is very simple and inexpensive.

The multiwall construction makes it possible to use papers with special properties, for instance, a high wet-strength or a greaseproof inner wall next to the contents, intermediate layers of asphalt or other impregnated kraft, and outer layers which will withstand scuffing and abrasion. When sewed with a special sealing tape, they are sift-proof and have been approved by the railroads for carbon black and for some toxic insecticides. Both the closure and the walls of these bags can be made waterproof, so that the filled bags will stand immersion.

Valve closed multiwall bag on automatic filling machine.

When properly filled the bags can be stacked and handled conveniently, being built up in the warehouse with portable stacking conveyors.

Sugar, wheat flour, peanut flour, dried eggs, coated rice, salt, dried skim milk, various dry cereals and soybean meal, are among the products now shipped in multiwall bags. A test shipment of raw sugar from Cuba, in special 200-lb. open-mouth bags, showed that these can satisfactorily replace jute bags.

Multiwall bags also can be used as shipping containers for smaller bags, such as 5- or 10-lb. sugar bags. They are not suitable for dehydrated foods.

Resin-Impregnated Bags

Food bags, either cloth or paper, can be treated with the type of resin now used to coat paper cap liners. Such bags protect the contents against damage or contamination from dust, water and any oil, grease or other nonedible material encountered in transport. They are not known to be in use in this country at present, but cloth impregnated with resin is employed in England for transport and cold storage of meat, butter and perhaps other commodities.

Cooperage

Lined or coated barrels can be used for many foodstuffs, but at present the number of things so shipped seems to be limited. Dried eggs are shipped with double crinkled wax-saturated kraft liners, and dried skim milk is put into barrels with two or three waxed-paper liners. Fruits preserved with sulphur dioxide are shipped in old wine or whiskey barrels. Slack barrels are used to a great extent in storage and handling of fruits and vegetables.

Adhesives

The raw materials situation has changed so frequently that adhesive manufacturers have had a hard time keeping abreast of the changes. Many of the special adhesives that were developed a year ago have had to be modified because the chemicals used in compounding have become critical and are on allocation.

For the weatherproof boxes the problem has been to retain adhesiveness while improving the waterproof property of the sealing compound. Water-white starch with urea formaldehyde has been found serviceable. One company working with this type of adhesive has been able to furnish a product which will meet the needs for solid laminated fiberboard and also has made possible the production of a corrugated board with laminated liners and a laminated filler.

There is now a tremendous demand for thermoplastic adhesives to be used in making moistureproof cellophane and glassine laminated bags and for lining fiber containers with cellophane. Here there is not only the question of obtaining adhesion, but the adhesive must not destroy the moisture-vapor-proof qualities of the film. Wax resin adhesives are used for laminating cellophane to glassine, kraft and other papers, for moisture-vapor-resistant packaging. These adhesives provide an additional moisture-vapor barrier, and must not only be nontoxic but contribute no odor to the assembled sheet.

Can-labeling glue has had to be modified. The new cans with thinner tin coating must have labels attached with nonhygroscopic glue because otherwise there is danger from rust.

Pulp and Paper Unit Packages

Pulp and paper containers for food consist essentially of various solutions to the problem of providing a chemically suitable film with adequate mechanical support. Glassine, wax paper, vegetable parchment paper and cellophane are now available for protection, kraft paper and boxboard for strength.

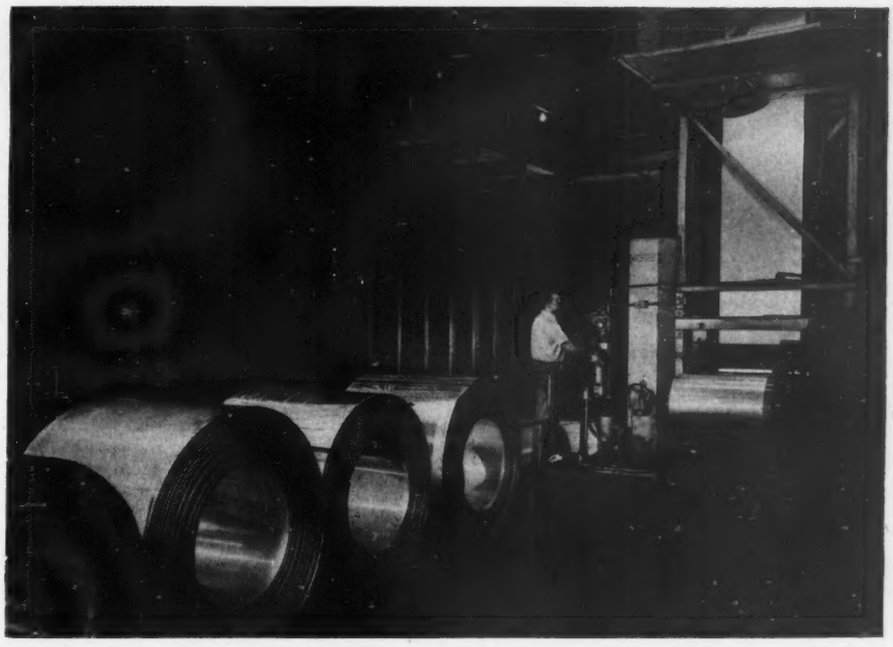
Glassine is a general term for a type of paper handled in manufacture so that it is smooth, dense, transparent or semitransparent, inherently greaseproof. It is fairly impervious to liquids and vapors, because of the small pore size. Any paper, sized or otherwise, may be waxed, after drying, by dipping in a bath of molten wax or by treating with dry wax in the finishing. Wax papers are water resistant and vapor resistant as long as the wax protective film is maintained intact. Vegetable parchment is treated in manufacture so as to have a very high wet strength. Cellophane has good natural resistance to moisture, moisture-vapor and grease penetration. Kraft paper is manufactured to develop high strength, and it may be sized or glazed to develop various surface characteristics. Boxboard is built up to provide bulk and rigidity, with strong surface layers or liners. It also can be sized or glazed.

And finally, any of these can be laminated with any of the other types, or built up into sheets of several thickness by the use of suitable adhesives, and the built-up sheets will each contribute its special property.

Converting these into satisfactory packages introduces a wide range of possibilities.

The simpliest package is a "wrap," a single sheet folded around the product, such as the greaseproof and light-resistant dry-waxed paper on Fleischmann's yeast. At the present time wraps for cheese are giving trouble. Foil was satisfactory. The wrapper must give protection against moisture and must be easy to handle, durable, grease resistant and flexible enough to adhere closely to the cheese. A specially coated cellophane is now being used.

Envelopes and bags are probably the most widely used packages. These are easily made, on high-speed machinery, in almost any paper or combination of papers, plain or laminated. There are limitations on equipment available, especially as bag-making machines are highly specialized. Changes from one type of bag to another sometimes involve unexpected difficulties. Elimination of windows, for instance, brings up the question of getting plain bags printed, at least to the extent of identifying the contents, and that may put the delivery date for the new bag off for weeks or even months.



Finishing end of an electrolytic tinning line.

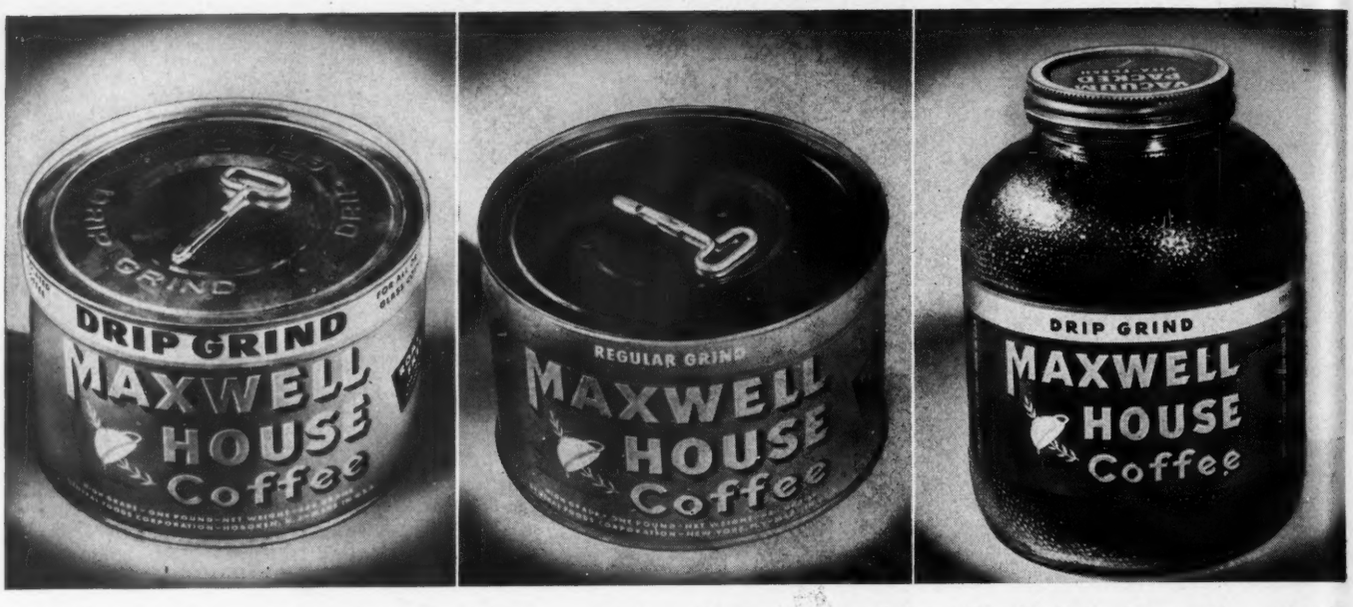
Heat sealing and adhesives both tend to break down moisture-vapor-resistance, so that the protection after converting is often less than that indicated by the properties of the sheet. For highly resistant bags a combination of adhesive, heat sealing and crimping is sometimes used, and at least one bag maker is planning to crimp in two directions to get a surer bond.

Frozen foods seem to be well protected against moisture loss by cellophane. Judging by the published figures of Woodruff and Dupree, at the Georgia State Experiment Station, if the loss through Pliofilm is 1, that with cellophane will be 2 to 2½, and waxed paper on this arbitrary scale would allow a loss of 8. Pliofilm tends to deteriorate after prolonged exposure at very low temperatures. For preventing moisture absorption the best suggestion seems to be a recently developed sheet with MSAT cellophane laminated to kraft and that to an acetate sheet. The acetate may be of help in preventing insect infestation, and it keeps moisture away from the inner lamination.

Folding boxes with linings or with separate bags are too familiar to need any discussion. Some combination of the bag and box can be designed for almost any packaging problem, and most of these are so built that they can be used on high-speed packaging machinery. The only difficulty comes when it is necessary to provide a dip or outside seal for greater protection, as is done in the Army subsistence ration packages.

Cylindrical containers with fiber ends are now supplied in almost as many varieties as are bags and boxes. The cylindrical containers have great strength for their weight. The spirally wound type can be made at fairly high speeds, and can be laminated with the resistant plies overlapped on the inside to give a completely resistant inner surface. Convolute winding gives greater strength in the body, but the blank must be laminated before winding, if at all, and it is not possible to avoid a raw paper stock edge within the can. The lap-seam fiber cans designed for regular can making equipment are restricted to only one thickness of paperboard and their strength is limited, but they can have some additional protection through use of specially treated label stock. Lap-seam cans can be made in rectangular shapes, to save shipping space, but there is still more waste space than with a regular folding carton. The lard container on page 67, made with a specially constructed greaseproof cellophane bag liner, is a good example of the possible applications of the cylindrical container.

With all the many packaging materials available, any food processor should, with a little ingenuity, be able to find something suitable for the duration.



War history of coffee package—(left to right) from tin, to black plate, to glass with metal cap, to glass with paper caps. Two types of paper caps are used, one without threads and one with threads, the latter being stiffened with an impregnating material. Both caps have a heavily waxed, stiff paperboard disk liner which effects seal.

Keeping Ahead of Packaging Crises

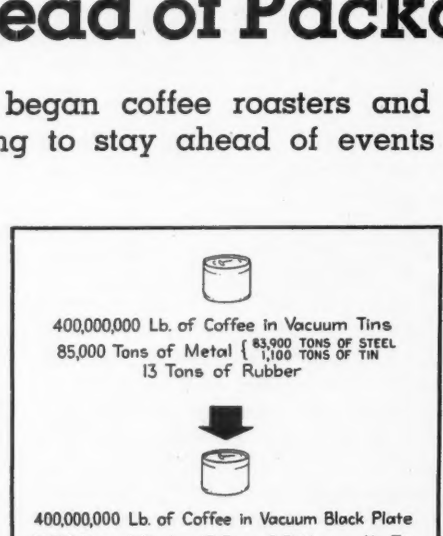
Since the war began coffee roasters and packagers have been busy trying to stay ahead of events forcing changes

By J. K. EVANS,
General Foods Sales Co., Inc.,
New York.

PACKAGING of coffee in consumer packages has been a race, ever since the war began, between everyone connected with the coffee roasting industry and increasingly acute shortages of critical materials. Coffee roasters and packagers have been busy trying to keep one jump ahead of events forcing drastic changes upon us.

Until the Japanese conquest of Malaya and other sources of tin, our own packing of Maxwell House coffee was in the familiar vacuum tin can. As soon as Japan gained control of the world's principal tin sources, it was evident that consumption of this critical metal would soon have to be curtailed. Therefore, we began to discuss the use of metal cans using much less tin, and experimental packs were put up. Our supplier was soon ready to produce the new type of container. And the transition was hardly noticed by consumers.

This was a satisfactory vacuum package from every angle, but, although it had a tinplate body and bonderized ends, other changes were in store, the initiative coming this time from the can company. It had developed a method of continuous welding of can bodies made from lithographed bonderized plate and we soon adopted this package, so that, when the M-81 order came out prohibiting the use of tinplate for packaging coffee, we were through with our necessary preliminary tests. The new package could be adopted without further research.


400,000,000 Lb. of Coffee in Vacuum Tins
85,000 Tons of Metal { 83,900 TONS OF STEEL / 1,100 TONS OF TIN
13 Tons of Rubber
400,000,000 Lb. of Coffee in Vacuum Black Plate
85,000 Tons of Steel — 13 Tons of Rubber — No Tin
260,000,000 Lb. of Coffee in Vacuum Jars with Metal Closures
4,300 Tons of Steel — No Rubber — No Tin
260,000,000 Lb. of Coffee in Vacuum Jars with Substitute Closures
? No Steel — No Rubber — No Tin ?

Graphic illustration of changes in coffee packaging and amounts of materials used in each stage by entire coffee industry.

By this time, however, the need for conservation of the use of steel as well as tin also began to be apparent. Subsequently, package studies made in our own research laboratories on lining compounds bore fruit that was welcome during the transition from metal to glass packs.

Our can suppliers and our management became aware of an impending scarcity of steel. By the spring of 1942, our national armament program was so huge that any prudent user of steel in a nonarmament industry realized that steel was likely to be denied to him. We considered the glass package as the most likely alternative vacuum package, and installed glass packaging lines in some of our plants. Fortunately the technics of glass packaging

had been worked out for some years on a peacetime basis. To adopt the glass vacuum package required no serious technological risks other than the mechanical problems of installing the glass packing equipment which we still were able to acquire.

Peacetime glass packaging of coffee was predicated on an abundance of glass, machinery, metal for closures and rubber for sealing gaskets for the closures. By the time we had changed a few of our plants from metal-container lines to glass-container lines, with everything operating smoothly, it became apparent that we could not count on a continued supply of metal for closures or rubber for gaskets. Ship sinkings were high, the rubber shortage was acute, and the Japanese were still advancing into new areas in the Southwest Pacific, precluding further imports of rubber from that quarter, and necessitating vast war uses of steel.

Enough steel plate was still allocated to use in coffee cans so that a very few of our coffee packaging lines would operate on vacuum cans for military orders, but all other vacuum packages must perforce be glass packages, although with expectation that the materials for metal closures would be cut off at an early date to save steel. In the meantime our research department had continued the study of resilient gasket materials containing no rubber.

In encouraging the research department to press its investigation aggressively, we were motivated largely by two things. It is generally known that the absence of oxygen (a condition most easily and practically obtained by a high vacuum) is the only way to insure a long merchantable life for ground roasted coffee. Also, we were motivated by the fact that we believe the most economical distribution system for ground roasted coffee through all types of retail outlets is through use of the vacuum package. Hence the research—with emphasis on everything, like gasket compounds, that could make the vacuum package possible.

When we began cooperative tests with the glass manufacturer to find a satisfactory nonmetallic vacuum closure, we were much gratified that our research department was able to contribute to the development of a composition cap that could be made of available materials. That neither we nor the glass company were far in advance of rapidly moving events is indicated by the request, made in September, 1942, on behalf of the entire industry packing coffee in vacuum containers, to the Container Branch of WPB to permit our continuing temporarily to use black plate for vacuum closures. For under M-126, the deadline was October 1, 1942, after which no more black plate could be used.

The graphic illustration accompanying this discussion portrays changes in packaging and amounts of materials used in each stage by the entire industry. The industry position was depicted rather than our own corporate picture for we were happy to have the industry utilize such developments as we had been able to create. It will be observed on the chart that the total amount of coffee has been reduced by the shipping problem, which in turn has reduced the quantities of packaging materials needed, though it hardly has made the coffee roaster's business problems any easier.

As a result of the request, WPB granted a 30-day extension of deadline to November 1, 1942, by which date it was possible for us to complete the changeover from a metal closure to one requiring no steel, no tin and no rubber.

Where From Here?

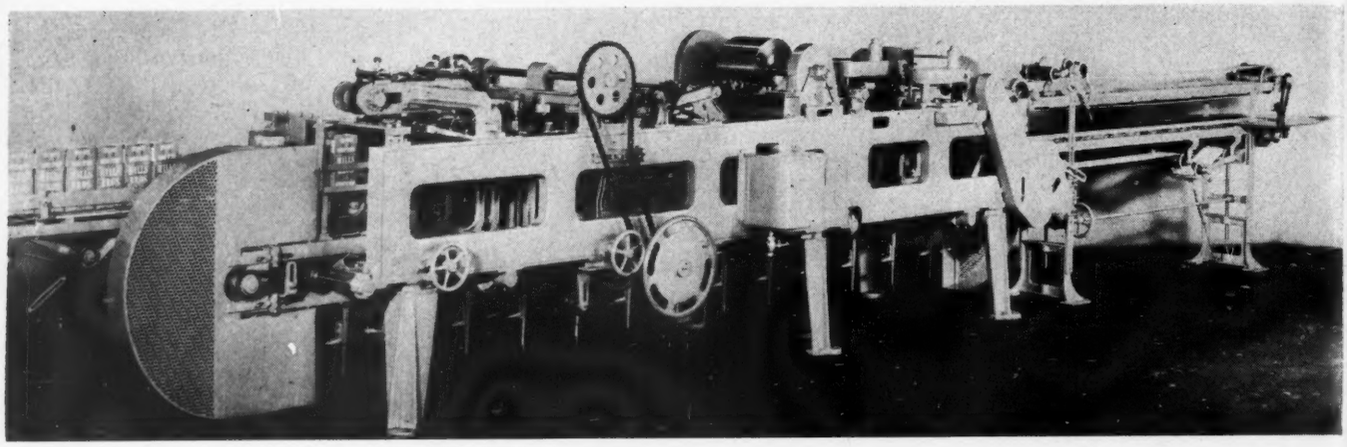
Where do we go from here? It would seem as if the industry, organized more to package coffee in vacuum glass containers with noncritical closures, would be in a relatively secure position. But we do not want to be complacent, and are seeking the direction from which other packaging problems might strike. We hope to have solutions ready when new problems arise.

If wartime necessity should require coffee roasters to abandon the glass container and vacuum packaging, the alternative package, if such a change is forced, will probably be the paper bag.

Should the industry be forced to abandon vacuum packaging entirely without a satisfactory substitute, it would be an unhappy event for all coffee lovers. Wartime transportation difficulties and delays would make it difficult indeed to distribute fresh coffee in ground and roasted form to many areas within the limit of merchantable life of the product.

Courtesy Owens-Illinois Glass Co.

Vacuum closing machine in operation on glass coffee jars with paper caps. Only slight mechanical adjustment is required to adapt vacuum closing machine to use of paper cap.



Roll closer and top sealer operating at 90 per minute. This unit has been installed at Hills Bros. plant for packaging "Blue Can" coffee.

Standard Packaging Machines Are Doing the Wartime Job

Few changes have been made, except for adapting prewar units to special operations. For the most part, packages and packaging materials have been designed to fit available machines

MOST of the package machinery manufacturers are devoting their facilities and the efforts of their engineers to direct war production. One or two, such as Pneumatic Scale Co. and Standard-Knapp, are doing nothing but war work. Others have been able to continue in some measure to make and service packaging machines.

Maintenance service is being stressed. It is vital to do so because the great majority of the machines are now being used for essential foodstuffs.

Because of the high priorities necessary for new equipment, only a few new installations have been made. J. L. Ferguson Co. is producing a number of items for Naval requirements, but has built some of its own line of equipment for plants producing war goods. The Frosted Foods Division of General Foods has new machines for wrapping large quantities of quick frozen foods for the Army.

The huge number of individual portions of powdered or crystalline materials in emergency ration packages has required additional machinery. For the lemon powder and bouillon powder of Ration K the Quartermaster Corps specifies a special laminated heat-sealed cellophane envelope. The Transwrap machine takes heat-sealing films from the roll and automatically makes the package, fills it with the desired amount of material, and heat seals it. Stokes and Smith has supplied many of these for this particular work, and, in addition, has changed over a number of the older machines so that they would handle this package.

Reynolds Metal Co. has designed a compact dehydrated food packaging unit consisting of loading table, bag-former and chute, and carton slide table, which requires only 90 board feet of maple and 85 lb. of steel. This is combined with a Amsco rotary bag sealing machine, a special vacuum attachment and suitable conveyors. The standard unit produces a package 13x7x14 in., but it can be adapted to other sizes. This is being supplied to dehydrators who have government contracts.

J. L. Ferguson has supplied new equipment for powdered eggs, and machines which were in service have been converted for Lend-Lease and Army food packages. This company has also supplied equipment for gluing and sealing the Hershey Chocolate Co.'s new paper carton for cocoa.

In a few cases coffee packers who formerly used vacuum tins have been able to get equipment to produce a bag-in-box package. Hills Bros. Coffee, Inc., San Francisco, has two lines of packaging machinery, entirely automatic, furnished by Battle Creek Bread Wrapping Machine Co. Wilkins Coffee Co., Baltimore, is now using an automatic filling and sealing machine for a carton designed by Robert Gair Co.

Filling machines, and those for box making, sealing and wrapping, as well as labelers, have always been designed for flexible operation. This has made conversion much easier. The Interstate Folding Box Co. furnishes a folding box with a completely prefabricated inner liner. This package is being used by several companies with Interstate's patented Rotoseal machine, but Borden is packing dehydrated soup for the Army in the package by using a converted Stokes and Smith unit, and other packers use simple equipment, such as bag sealers or crimpers, and hand sealing.

Johnson sealing machines, supplied by Battle Creek Bread Wrapping Machine Co., have been very widely converted to wrapping Army rations and Lend-Lease cartons. Most of these machines formerly were used for cereals or the familiar Cracker Jack package.

Semiautomatic Ermold labelers are being used universally for labeling glass containers up to and including gallon jars or jugs. Due to the standardization of glass containers, the automatic labelers can, in many cases, be adapted to

(Turn to page 78)

Protection Against Moisture Vapor A Must for Army Packages

By MAJOR JAMES d'A. CLARK
Subsistence Research Laboratory, Quartermaster Corps, Chicago, Ill.

Here is an excellent picture of what it takes to make packages that will protect their contents under the severe conditions met in supplying the armed forces. It puts emphasis on those points which have given the Army considerable trouble

ONE definition of food can well be that it is "a palatable, nontoxic material that will spoil if stored moist in contact with the air at normal temperatures." Packaging of food for the Army is concerned with dividing it into convenient portions and preventing such spoilage.

Presence of some moisture, some heat, and, in nearly all cases, some air is a necessary condition for food decomposition. Through exclusion of any one of these factors, storage of foods for extended periods becomes possible. For that reason we have dehydrated, frozen and canned products as three forms of preserved food. All three are extensively used by the Army.

Dehydrated foods must be kept dry to assure their preservation. Because of the current shortage of metal, means —other than sealed cans—for maintaining food products in a dry state for overseas shipment have become especially desirable.

To make the problem no less easy, much of this war is being and will be fought under conditions of extreme humidity and temperature. Indeed, because of aerial transportation and fighting, even extremes in atmospheric pressure have to be dealt with. Consequently, a package which might prove satisfactory for ground-level conditions will expand and fracture at high altitudes where the air pressure, instead of being a normal 15 lb., becomes as low as 5 lb. per square inch at 30,000 ft. In such a case, the outward pressure on a sealed package is about 10 lb. on every square inch of its area. As an example, a K Ration unit with dimensions of 7x3½x1½ in. will have a bursting force of about 240 lb. on its major panel. Practically, only metal is able to withstand such conditions without destroying the continuity of the seal.

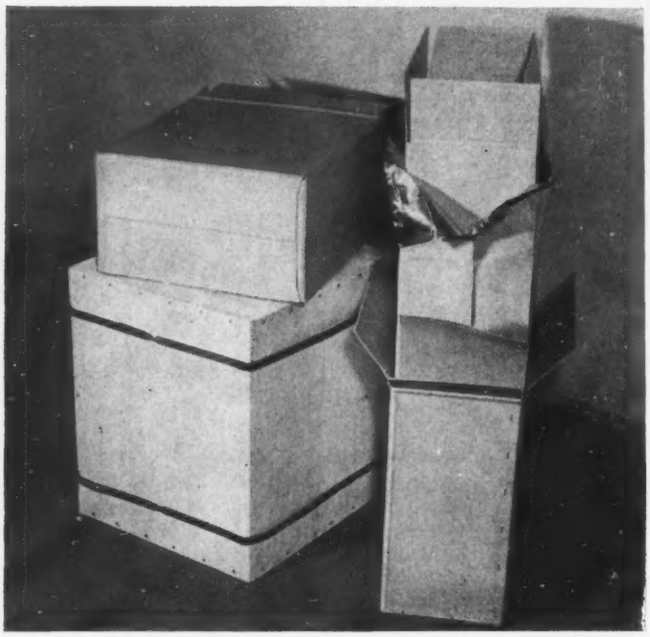
For the packaging of meats and some dairy products, which spoil very easily, hermetically sealed tin cans are necessary to keep them over an extended storage period except when frozen and, to a limited extent, when dehydrated. For some products like carrots and green leafy vegetables, all excess air must be excluded from the package. Consequently, such foods are packed in an atmosphere of inert gas—nitrogen or carbon dioxide.

When gas packing is used, the container has to be fully gas-tight. So far, metal cans appear to be necessary. To avoid the use of metal cans wherever possible, packaging studies relating to dehydrated or dry products are concerned largely with finding suitable containers made from paperboard, lead foil, cellulose films, waxes, asphalt and other materials which will resist physical abuse but which are not as critical as are steel and tin. With the gratifying help of the pulp, paper and allied industries, a number of new and very interesting packages have been developed. This will result in superior peacetime practices.

Waterproofness and Water-vapor-proofness

Before proceeding further we may well clarify the important difference between a waterproof and a water-vapor-proof package. To illustrate waterproofness, a greasy sieve will hold water perfectly, but obviously it will offer no barrier to water vapor any more than it would to a breath of air. Water vapor is a gas, as is air, and possesses the properties of gas. For that reason, only an airtight package will resist the entrance of water vapor. However, with water vapor even gas-tightness in a package is not enough. Any film that is at all hydrophilic (water loving) cannot appreciably resist the passage of water vapor even though it may be fully gas-tight. This property is not specific for

Submersion in water is one test for water-vapor resistance of a package. During immersion the rate of water-vapor transmission is from two to three times the rate when the package is subjected to a saturated atmosphere.



A recently developed water-vapor-resistant container for dehydrated vegetables consists of a taped-joint corrugated carton sealed inside a flexible bag made of lead foil laminated to kraft paper by a film of asphalt which in turn is protected by a water-repellant solid-fiber box. Two of these units are packed in a steel-strapped wooden box. An airtight, sealed metal container has been replaced.

water-vapor. Any gas which will dissolve or will be absorbed by the material constituting a barrier film will readily pass through the barrier. For that reason, the moisture in air coming in contact with one face of an untreated regenerated cellulose or other hydrophilic film is absorbed on the film surface, passes through the film and is evaporated from the other side.

With these properties of water vapor in mind, it should be clear that to provide an impassable barrier against water vapor, a protective container for dry foods must possess not only a gas-tight film but one made from a completely hydrophobic (water hating) material. If a film can be wetted with water, moisture-vapor-proofness is not a matter of speculation; it is a certainty that the film will not resist the passage of water vapor very well. Even a thin film of ordinary rubber will offer but a poor barrier to the passage of water vapor. Special rubber or a mixture of rubber and wax is necessary to provide an effective barrier. That a discontinuous or broken film, as with a paraffin-coated box with a cracked edge or corner, will not prevent the passage of water vapor is evident even though, like a greasy sieve, it will prevent the passage of liquid water. In this case, not only do we have the normal diffusion of gaseous water vapor through the crack or opening, but when the package is stored a marked breathing effect occurs as it is alternately heated and cooled in accordance with daily fluctuations in temperature. Heating expands and expels the dry air and cooling in turn forms a partial vacuum in the interior which draws in moist air. Moreover, there is a similar breathing effect with changes in barometric pressure. These changes permit the packaged contents to absorb each quota of moisture received in the incoming air until they become saturated with moisture.

Rigid Packages

Two types of packages have been developed in place of cans to resist the transfer of moisture, one rigid and the other flexible. Each type has its special advantages and disadvantages. In almost every case, the material used for the water-vapor barrier has been a special wax or asphalt, and, in some cases, lead foil in addition.

An example of a rigid water-vapor-resistant container is the type of box used by the Frankfort Arsenal. It is usually made from a 40-point, double kraft-lined bending board. The box is provided inside with snug-fitting B-flute corrugated board at the top, bottom and sides to insure rigidity. After filling, the box flaps are sealed, preferably with a moisture-resistant glue, and the carton is dipped in a hot molten wax—a mixture of ordinary paraffin wax and soft microcrystalline wax. After the initial dip to saturate the board partially, the box is again momentarily dipped in the wax at a somewhat lower temperature to provide a continuous film of wax on the exterior of the carton.

The small carton used for packaging the K Ration units according to the most recent specification is another good example of the use of the double wax-dipped construction.

This treatment provides a truly water-vapor-resistant barrier, providing the resulting package is airtight. Unfortunately, this condition is very difficult to obtain in practice. The air in the box is heated during dipping, and when the box cools the partial vacuum created tends to produce a pinhole somewhere in the wax barrier. However, in several respects this procedure is better than a single wax dip or, the use of a wax spray. Penetration of an appreciable part of the board with the wax mixture provides a barrier reinforced with fibers. This barrier is not nearly so brittle as is a surface film and, in addition, provides an excellent foundation for the outer wax film. If the outer film is cracked by mechanical handling, there is then a good chance of its not cracking off. Also there is the possibility of the film healing itself later, particularly if the package is stored in a warm place. It should be emphasized that while a wax-impregnated board without a continuous wax film on one surface is effectively water resistant, it is not water-vapor resistant to a satisfactory degree. The moisture can condense on the exposed fibers if these are not covered by wax and, by "wicking," can then pass through the board by traveling along and through the fibers.

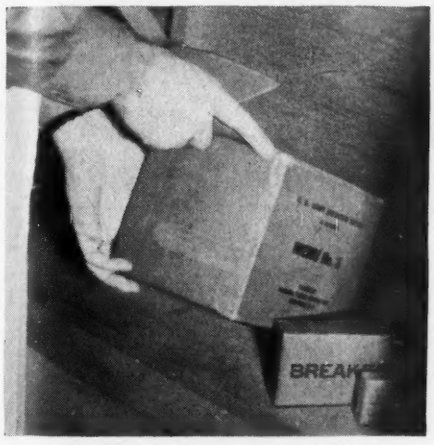
The function of the microcrystalline wax is to give to the film flexibility at low temperatures, and to give it improved water-vapor-resistant qualities, especially after it has aged.

One of the best constructions for a large, rigid, water-vapor-resistant container has been developed by a box manufacturer in conjunction with the Subsistence Research Laboratory at the Chicago Quartermaster Depot. The container, of 0.090-in. board, has an asphalt-impregnated kraft outer surface laminated to the board with a continuous film of asphalt. After the box is filled and the flaps of the carton are closed with a suitable glue, a sleeve, made from material similar to that of the carton but preferably thinner—to provide flexibility—and having a length equal to that of the container, is slipped over one end. This covers the top, bottom, front and back, leaving only the ends of the container exposed. The channels formed by the edges of the container and the sleeve are then filled with a thin line of hot wax-asphalt mixture. This is applied by wiping the sides of a broad spatula, previously dipped in the molten mixture, across the four edges at both ends. The lap and stitches of the manufacturer's joint on the sleeve are also covered with asphalt from the spatula. Pieces of untreated kraft paper are applied over the asphalt after application to permit the container to be handled without difficulty. The sleeved carton is then enclosed in a taped-joint corrugated box.

This method of construction and asphalt application is preferable to dipping the top and bottom of the con-

tainer in hot asphalt after sealing. Because the air in the box is heated appreciably during immersion, ensuing difficulties result from the vacuum created as the box cools. The vacuum tends to suck holes in the asphalt seals. Heating of the enclosed air is practically avoided when the asphalt is applied with a spatula. Moreover, the apparatus required is negligible compared with the conveying equipment and tanks necessary for the dipping process.

Because of likely damage to any wax-dipped box or one having asphalted closures when the box is dropped, additional outer protection is essential if full water-vapor protection is desired. The recommended practice is to enclose such a rigid container in a nailed wooden box, preferably protected by a cushion in the form of a taped-joint



Damaging of a corner or edge of container is likely to break barrier to water-vapor penetration and permit spoilage of contents, when use is made of commercial type of waterproofed containers.

corrugated carton. While a good fiber case withstands far more mistreatment before fracture than does a nailed wooden box, the wooden box, almost up to the time that it falls apart, prevents flexure of the contents and keeps the water-vapor-resistant film fairly well protected. It is surprising how easily even soft asphalt mixtures will fracture with a sudden sharp blow.

Flexible Water-vapor-proof Packages

Because of the enormous tonnage of goods being shipped abroad in wooden boxes, and because of the current shortage of suitable lumber, an adequate supply of wooden boxes for the shipping cases is not always obtainable except for special purposes. For use under these conditions the second type of water-vapor-proof pack, the flexible type, is especially suitable. Several new laminated sheet materials have been suggested to meet the large and growing demand for bags which comprise the flexible element.

As a matter of precaution with respect to selecting material for the bags, the point should be made that no matter how resistant a flat sheet may be to the passage of water vapor, sheets cannot be kept flat when made into bags, nor can creases be prevented during and after packing. This point is significant in that the critical and important measure of the water-vapor transmission of a material is the one obtained after a specimen sheet has been creased in a standard manner. Correctness of this statement is indicated by a simple wax-coated sheet. In a flat, uncreased state it possesses a high degree of resistance to water vapor, but upon being creased or folded its wax film cracks. A very poor barrier results.

Other important properties of the bags are flexibility at low temperatures and the ability of the bag material to resist dehydration with consequent embrittlement through loss of moisture to the product contained in the bag or to the air during storage. Special care is required in selecting bag materials for packaging dehydrated or well-dried products because the dryness tends to destroy the effectiveness of the plasticizer usually incorporated in films to give the necessary flexibility and toughness.

A very cheap and yet effective bag material, provided all the seals around the edges are properly made, is a thin sheet of kraft paper laminated to another with a continuous film of suitable asphalt. One of the best available materials at present is a triplex-laminated sheet composed of a regenerated cellulose film with a heat-sealing coat laminated to a sheet of very thin lead foil. The foil in turn is laminated with a thin film of asphalt to a sheet of kraft paper. The lead foil being about 0.0006 in. thick, invariably contains a number of small pinholes, but these are plugged either by the asphalt or by the laminating agent used for the cellulose film. While this laminated sheet is so water-vapor-resistant as to be practically water-vapor-proof, it may be less than satisfactory when made into a bag, either because of defective sealing of the seams or by holes being formed at the corners of the bag because of the fragility of the triplex sheet. Perfect sealing of the edges is a difficult operation. Consequently, there is a decided demand for a better sheet, perhaps one including a lead foil, which will provide a seal that is easier to make and is stronger.

Several bag materials have been developed. They consist of creped kraft paper heavily laminated with an asphalt mixture to a similar sheet and sealed around the edges with an asphaltic composition. For many purposes, if the asphalt materials used have been rendered odorless, these bags have proved very satisfactory and, in general, are much more resistant to mechanical damage than the laminated lead-foil sheet.

An excellent way of using a flexible bag, particularly if it contains lead foil, is to place the product to be packed in a taped-joint corrugated carton, seal the carton in the bag, place the bag in an outer corrugated box, and overpack the whole with a suitably strapped waterproof fiber shipping case. Special care is necessary in assembling the package to avoid damage to the bag.

Waterproof Seams

When a laminated water-vapor resistant bag or container, or even a laminated waterproof case is sealed, the result is often ineffective for reasons we shall discuss briefly. Suppose a sheet of nonwaterproof material "A" is laminated to another sheet of non-

Latest development in moisture-vapor proofing a container made of board with an asphalt lamination is to give it an outer surface of asphalt-impregnated kraft, cover it with a sleeve of carton board, and seal it on edge and ends with hot wax-asphalt mixture applied with a broad spatula.

waterproof material "B" by means of a waterproof laminating material "R," forming a composite sheet "ARB." When this sheet is formed into a bag and a seal made with a similar or another waterproof material "S," the "ARBSBRA" arrangement of material occurs at the bag seam. It is obvious that, if sheet "B" can be penetrated by moisture, the moisture can get into the interior of the bag along the cut edges of "B" because "S" extends only to the edges of the seal. Further, if moisture weakens the sheet "B," the seam becomes no stronger than the transverse strength of sheet "B" when moist. For that reason, no matter how moisture-resistant material "R" or "S" may be, the seam may pull apart in the order of "ARB-SBRA" or "ARBSBRA." When a closure is made for a truly water-resistant or moisture-vapor-resistant bag, it is necessary to insure that the sealing material "S" not only sticks the surfaces of the edges of the two sheets "B" together but also that it penetrates and preferably satuates the two sheets over the area of the seam. In this way the adhesive "S" comes into contact with and adheres to the barrier material "R" in both of the adjoining laminations. Then only can both liquid and gaseous moisture be fully prevented from penetrating the seal and passing into the interior of the bag. Since salt water or sea water penetrates paper very much more readily than does plain water, penetration by the adhesive is especially necessary to assure a water-tight seam for resisting salt water. The use of a glue, no matter how waterproof, clearly is not enough.

Some Army Requirements

Much remains to be done in the development of a satisfactory water-vapor-resistant adhesive which will remain flexible, which will not be seriously affected by low or high temperatures, and which will penetrate the surfaces of laminated containers so as to effect a bond between the moisture-resistant barriers in their structure. To make attainment of this bond easier, it is desirable to have the resistant barrier situated as near as possible to the surfaces to be joined.

Other requirements for Army packaging have been recently indicated.[1,2] They need not be repeated. However, the following is a suggested list of some of the physical requirements which a satisfactory package and packed commodity should withstand to be ideally suitable for overseas shipment:

1. The case and contents should withstand being dropped a number of times on a concrete floor, for example, once on each of two diagonally opposite corners, once on all six edges, and twice on each face. Each drop should be through a distance to give an impact equal to 100 ft.-lb.; falls of 2½ ft. for a case weighing 40 lb. gross.

2. After the previous treatment, the package should withstand submersion in water for 24 hours without damage to the contents. (This requirement is not necessarily that the case be able to withstand immersion in water, but rather to determine that the water-vapor-resistance of the packages was not badly impaired by the rough handling. In this connection, the fact that when a package is submerged in water, water-vapor is transmitted at a rate of two or three times that when the package is placed in a saturated atmosphere may be of interest.)

3. The case should withstand a temperature of 100 deg. F. and 95 percent relative humidity for at least 20 days without appreciable effect on the packaging or contents. (Adhesives may stand submersion in water for 24 hours and yet fail after being in a moist atmosphere for an extended period.)

4. The case and contents should withstand dropping twice on each flat surface after being stored at 0 deg. F. for 48 hours without the packages being appreciably damaged.

These suggested requirements are admittedly quite severe. Yet, in the light of recent experiences there is no reason to doubt that the ingenuity of those making packaging and packing materials will be able to meet these and the other requirements, and at a cost that is not inconsistent with the importance of having foods arrive in good condition for our fighting men.

REFERENCES

1. Robert R. Melson, *Paper Trade Journal*, vol. 115, No. 18, 36-38 (October 29, 1942).

2. Robert R. Melson, *Industrial and Engineering Chemistry*, vol. 35, 16-19 (January, 1943).

Standard Packaging Machines Doing the Job

(*Continued on page 74*)

labeling various sizes of glass packages up to quart capacity. Ermold is in a position to build new equipment, where preference ratings can be furnished, and has been maintaining service and repair part facilities.

Stokes and Smith filling machines have been changed from tin cans to glass jars for powdered milk and malted milk products, the conversion on these machines amounting to new augers and filling tubes and certain changes or adjustments in the feeding tables and guides. Other machines are filling paper canisters, round or rectangular, and folding cartons.

Most of the changes in packages have been planned with the requirement that the new package must be suited to production on existing equipment. Frequently the food company itself has been able to make the changes, after the proper package design has been decided upon, usually with the help of packaging engineers and representatives of the packaging machinery manufacturers. The paper canister now used for baking powder was selected to fit the machinery, and was put into production with very little difficulty.

Months of intensive research preceded the development of a sealing disk for vacuum packing coffee in glass without rubber or tin. The disk is used with a paper shell which was developed to fit regular screw-cap machinery. The new cap has been put into production with only minor adjustments and with the addition of two or three small machine parts.

In adapting some of its older machines to do new jobs on food containers the Miller Wrapping Machine Co. found that the necessary changes consisted chiefly of furnishing gluing mechanisms for non-heat sealing wrappers which were substituted for heat-sealing wrappers.

Peters Machinery Co. equipment has continued in use with very few changes, about the only adjustment necessary being that for thinner carton board and thinner paper liners.

Several of the manufacturers are making efforts to locate second-hand machinery of their manufacture which is available, and are supplying repair or replacement parts so that this can be put into operation where needed. And to a far greater extent than heretofore they are calling on the assistance of the plants using the equipment.

Package Machinery Co. has just prepared a booklet for distribution to customers which outlines a procedure that should go a long way toward preventing delays and expensive repairs. The instructions and suggestions are based on the experience of the service men in the field, who are still available when needed. It is pointed out that a stock of spare parts is maintained, as well as is possible at present, but that when a new part must be made the problem is to obtain the raw material. Welding is suggested when parts can be repaired by this technic.

National Biscuit Makes Trucks Last Longer

Bakery has strict preventive maintenance program calling for frequent inspection and liberal use of air and grease to keep trucks and tires rolling for duration. Reduced speeds also help

DAILY checks on tire inflation, monthly greasing and inspection and reduced road speeds are essential parts of the preventive maintenance system by means of which National Biscuit Co. is keeping its fleet of food trucks rolling for the duration.

NBC's conservation program was started long before the Office of Defense Transportation issued restrictions on tire conservation and reduced road speeds. Early in 1942, the company's Motor Division issued instructions to the managers of its some 270 distributing agencies throughout the United States to have truck tires checked daily and to limit the maximum road speed of vehicles to 35 miles an hour.

The instructions emphasized that daily meant daily—not weekly or monthly. And they specified that the inflation pressure in all tires was to be maintained within the limits recommended by tire manufacturers and established by the company's many years of experience as one of the nation's largest food fleet owners.

The maximum road speed of 35 miles per hour was not left to the judgment of the drivers. All engine governors were ordered set to that speed.

The Motor Division further ordered that under no circumstances were smooth tires to be regrooved. This was done to prevent damage to the tire carcasses. In the beginning, trucks with smooth tires were ordered to be operated at speeds under 25 miles an hour for safety reasons. These instructions were later changed by ordering the tires recapped in accordance with ODT regulations.

The company's preventive maintenance program requires that all trucks be greased and inspected mechanically after every 1,000 miles of operation, or not less than once each month. One of the important items of such monthly mechanical inspections is the checking of the wheel alignment. Nothing wears out a tire faster than a wobbly or misaligned wheel.

The mechanical inspections are made by the company's own garage mechanics at a few locations. All other inspections are made by local representatives of the truck manufacturers.

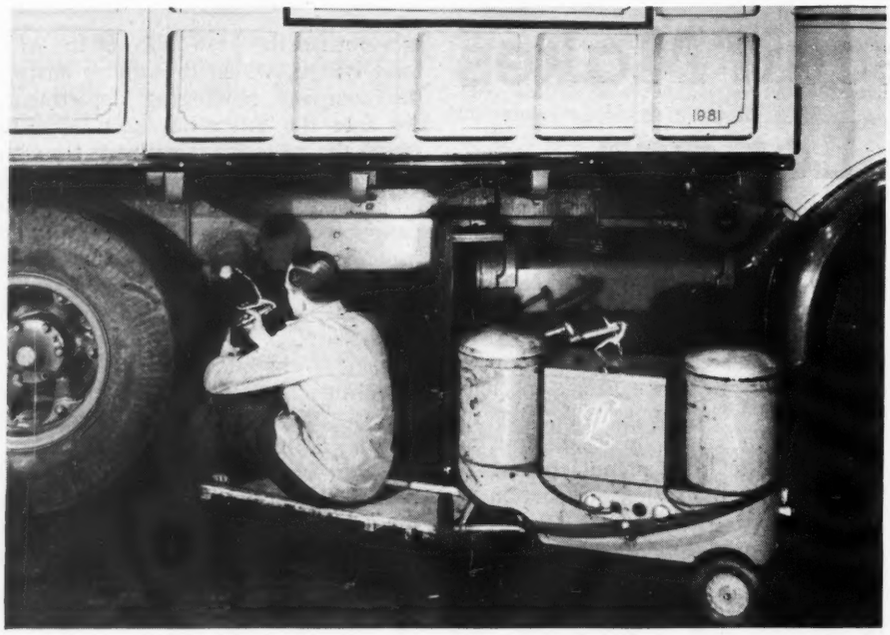
Another conservation instruction of importance requires that the best trucks be saved for use when parts to keep the older trucks in running condition become available. In other words, if the conditions of business are such that a truck is kept idle part of the time, that truck should be the best truck in the fleet.

To date, the company has experienced no particular trouble in securing the necessary repair parts for its motor truck equipment. When local manufacturers' agents or branches cannot furnish parts, the local NBC manager notifies the head office of the Motor Division, which in turn so advises the company purchasing department. To date the latter has been able to secure the necessary repair parts through the headquarters offices of the truck or parts manufacturers. And the company has not yet found it necessary to install at its own principal shops any equipment for metal spraying or metalizing to build up crankshafts or other metal parts.

Aside from the purely mechanical operating procedures previously described, the company has sought to reduce its truck mileage even in excess of the ODT requirements as a means of indirectly conserving truck life. Truck wear is more nearly proportional to mileage than to any other factor.

Proper lubrication and greasing play an important part in the company's preventive maintenance program—which is strictly enforced through adequate head-office control. Records of individual truck lubrication and greasing are maintained by vehicle number. In this manner, the lack of a report covering the lubrication and greasing of any unit is at once detected. Then instructions are issued to see

A daily check of the air pressure in all tires on all trucks is one of the means employed by National Biscuit Co. to keep its large fleet of trucks operating for the duration. Here Joe Schutz, foreman of the company's New York garage, reads the pressure gage on the air hose.



Grease is cheap and its use is not stinted in the NBC preventive maintenance program. All trucks must be greased and inspected every 1,000 miles or at least every month. The work is made easy by a creeper and a high-pressure greasing machine.

Careless NBC drivers may lose their jobs if they wreck their trucks. But certificates of merit are presented to good drivers who do their part to keep their trucks operating for the duration.

that the work is done as soon after the designated speedometer mileage reading as is possible.

Oil and grease are two of the least expensive items entering into the total cost of truck operation. So these are not spared in the NBC truck-maintenance system.

In the principal NBC garage shops and in many of the shops of truck company branches or dealers, modern high-pressure chassis lubricating equipment is utilized to lessen the time and cut the cost of chassis lubrication.

Adequate greasing of all moving or rubbing parts—such as spring bolts and shackles, universal joints, front-axle kingpins and drag links, clutch throw-out bearings and all brake hook-up parts—will greatly increase the lives of those parts. Even if such new replacement parts can be obtained, adequate greasing of the present parts will help reduce current maintenance expense by putting off to some more distant day the time of their renewal.

The lubrication of engine parts is also given close attention in the NBC scheme of maintenance. A few drops of oil at the proper points on the starter, the generator and the fan assembly will pay for themselves many times over in keeping those essential units in operation.

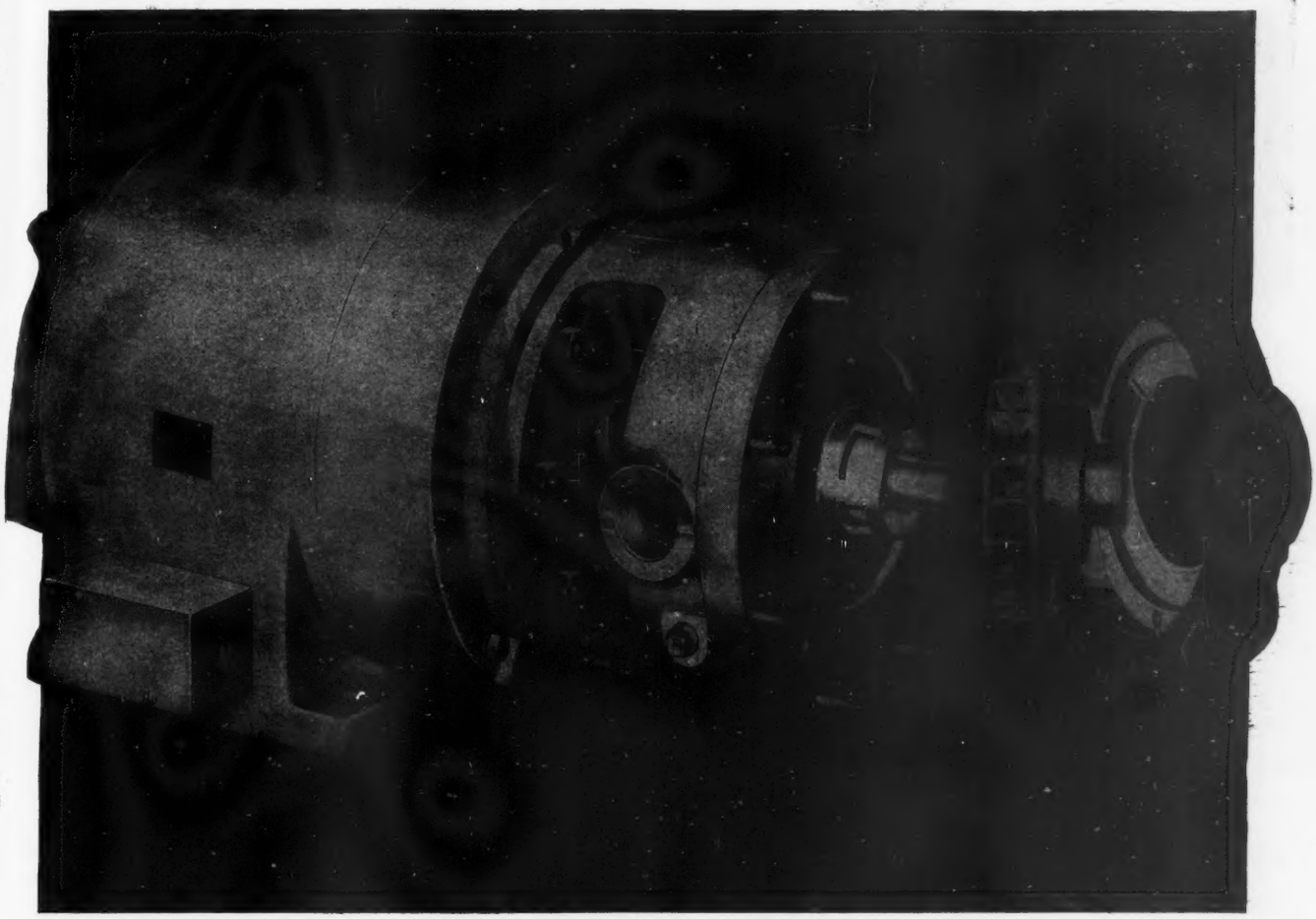
Proper change of oil in the motor itself is important, whether the oil is of the regular or detergent type. On the NBC trucks, oil changes are made at specified times in accordance with the long experience of the company and the make and type of engine involved. Oil filters help to reduce engine wear, as do filters on the carburetor air intake.

Because the best laid plans of any good maintenance program can be knocked into a cocked hat by an antagonistic crew of drivers, National Biscuit Co. has not neglected to stimulate its drivers and to impress upon them the necessity for their joining wholeheartedly in the plan to keep the company vehicles rolling for the duration. Careless drivers are cautioned that truck wrecks due to their negligence may cost them their jobs. And good drivers are commended for their work. Certificates of merit are presented to such men in appreciation of their efforts to win the battle against waste and to keep the truck wheels turning for the duration.

NASH CLEAN-AIR COMPRESSORS

(TRADE MARK REG.)

are Long Life compressors, because they have no internal wearing parts



The Nash Clean-Air Compressor has but one moving part, cast in one piece and rotating in the pump casing without metallic contact. No internal lubrication is necessary; therefore air or other gas compressed with a Nash is entirely free from oil contamination.

Dust and heat are removed from the air, or gas compressed, by the unique Nash "Liquid Piston". Air from a Nash Compressor is therefore delivered free from dust, heat, or oil, without supplementary filters or air washers, in a perfected mechanical structure with no internal wearing parts.

Air or gas from a Nash Compressor may be used for agitating, blending, maintaining pressure on storage tanks, or moving liquids and materials by pressure displacement, in connection with the most delicate food, beverage, or chemical process, without danger of contamination.

Bulletin D-252 tells all about Nash Clean-Air Compressors, and it is free on request.

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NEW PACKAGES & PRODUCTS

Cereal Bowl-Package

ONE of the most interesting exhibits at the recent packaging show staged by the Technical Association of the Pulp and Paper Institute was the new cereal bowl-package, now used in one form or another by the leading breakfast-food companies. National Biscuit Co.'s corn flakes, General Mills, Inc.'s "Wheaties," and several Kellogg products are now appearing in new waxed, waterproof boxes—milk and sugar can be added and the cereal eaten right out of the package. Each package contains an individual serving, and is thrown away after it has served its turn as a cereal bowl.

Roast Beef With Broth

WARTIME packaging limitations, a headache to manufacturers of already-established products, are even more difficult for the manufacturer putting a new product on the market. Standard Foods, Inc., Louisville, Ky., is introducing Sliced Roast Beef with Broth, containing large, medium and small slices of beef, with salt, spices and flavoring, ready to heat and serve. The company solved its packaging problem with an unusually heavy fiberboard container with a slip-over fiberboard top, containing 4 lb. of the beef with broth.

New Emulsifying Agent

MALTZETT CORP., Long Island City, N. Y., has introduced a new emulsifying product, "Short-Wel," for use in the baking industry. In presenting Short-Wel to the industry, the company offers a method of insuring equivalent shortening effect, with less shortening, to meet the recent government order limiting shortening to 2 percent in bread. It is reported that 2 percent of Short-Wel can be added by the baker to his 2 percent of regular shortening.

Short-Wel, which contains flour, cereals, lecithin and salt, was developed as an emulsifier to insure proper dispersion of shortening and fats or oils in the batch. Its high lecithin content is said to lower the surface tension of the fat, promoting a more even distribution of the fat throughout the dough and enhancing the lubricating properties of the shortening. It is packed in 100-lb. bags and 300-lb. barrels, solely for industrial use.

High-Flying Cereal

ACCORDING to Fisher Flouring Mills Co., Seattle, Wash., who market the product, sales are "zooming" on "Zoom," the new flaked whole-wheat cereal. The new cereal cooks instantly when stirred into boiling water—heat on the stove is turned off and the cereal allowed to thicken. This feature plus the nutritive value of whole wheat cereal and the fact that the product is an unrationed item has created wide sales appeal.

A "handysack" package similar to those used for other products in the Fisher line was developed for "Zoom," printed in red, blue and gold and showing on the reverse side a panel of silhouettes of aircraft approved for authenticity by the Army. A further promotional premium included with the package is a "zoomer," high-flying toy for the children.

Butter Extender

GELATINIZED starch, salt, powdered buttermilk, rennet and certified color are ingredients of the new butter extender developed in the laboratories of Curtiss Candy Co., Chicago, Ill., and now being given a market test in that city. "Spread-Mor," advertised "to make 1

"BLOW HEAD PRESSURE-21"

. . . a phrase from the strange language that helps make better glass

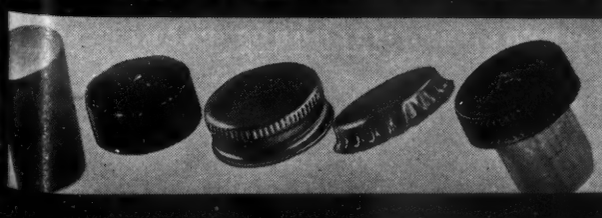
THIS IS JOSEPH HURST. All day long in one of Armstrong's plants, he reads things like "Blow Head Pressure—21. Drop in Blank—Early. Head Valve Set—Open." Phrases like these mean little to the layman, but to Joseph Hurst they mean the difference between ordinary glass and Armstrong's Glass. They tell him how to make every one of more than 45 adjustments on each glass machine in operation.

The card from which he reads is a history of previous runs of similar bottles. By following its strangely worded directions, he makes sure that the complicated machine settings are exactly right for the particular ware being blown.

Thus his special knowledge, and the knowledge of the men and women with whom he works, means that you can expect the same top-quality, the same consistent performance, from every run of Armstrong's Glass you order.

The story of Armstrong's Glass and of the men and women who make it is told in a new booklet, "Men and Glass." For your free copy, write Armstrong Cork Company, Glass and Closure Div., 4204 Jackson St., Lancaster, Pa.

ARMSTRONG'S GLASS



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CONSUMERS will be quick to recognize your package — in spite of wartime standardization — when you seal with colorful, lithographed Armstrong's Metal Caps.

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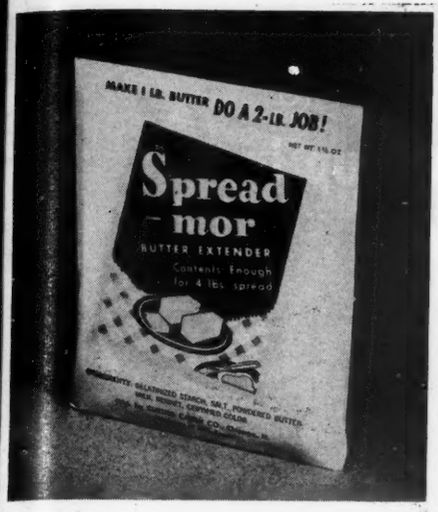
TODAY, with current material shortages growing more serious, and future shortages in sight, Armstrong's research experts are concentrating the Company's 83 years of closure experience on new ideas and new developments. They will be glad to help you with any wartime glass or closure problem you may have. Write Armstrong Cork Company, Glass and Closure Div., 4204 Jackson St., Lancaster, Pa.

The Army-Navy "E" has been awarded to the men and women of Armstrong's Closure and Floor Division Plants for excellence in the production of shell cases, camouflage, shells, aircraft parts, etc.

Armstrong's Closures

TURN STANDARD CONTAINERS INTO STANDOUT PACKAGES

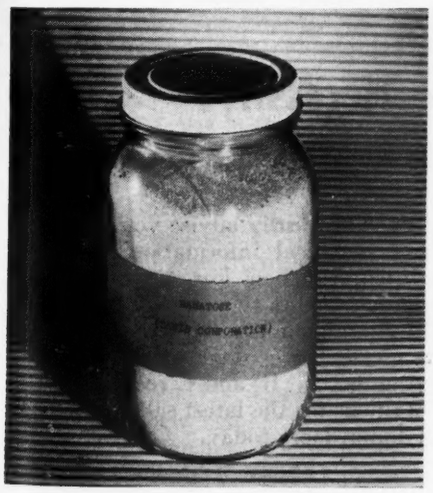


lb. of butter do a 2-lb. job," is packed in a paper envelope containing 1¾ oz. of the product, enough to make a 4-lb. spread when mixed with butter.

To make a spread, the extender is mixed with a quantity of lukewarm milk, then gradually blended with the butter in a mixer, and cooled.

Banana-Powder Product

"BANATOSE" is a new banana-powder product launched by Sanib Corp., New York, N. Y., a pioneer in introducing pure banana powder and dried ripe bananas in this country. Sanib Corp.'s banana powder, "Sun-Ban," formerly available chiefly to the baking and confectionery trade and to doctors



and hospitals for infant feeding, is the basis of the new banana product.

The formula for Banatose was developed by the Laboratory of Industrial Hygiene, with the following ingredients: 40 percent Sun-Ban; 28 percent powdered skim milk for protein; 28 percent dextrose for quick energy; 4 percent tricalcium phosphate conditioner, and United States certified color. The addition of the powdered skim milk and dextrose, in addition to contributing valuable food elements to the product, is reported to make Banatose more easily mixable than pure banana powder. Banatose is mixed and packaged in the United States, but the Sun-Ban powder is processed by spray drier at the modern Sanib plant at Puerto Cortes, Honduras. Because the company has just gone into production of consumer-size containers, the glass container illustrated here does not yet have the commercial label.

Soup in Paper Cups

ALTHOUGH dehydrated soups have appeared in a variety of packages including tins, glass pack, fiberboard, cellophane, foil and glassine, one of the first companies to pack in paper cup containers in Allen V. Smith, Inc., Marcellus Falls, N. Y.

Smith's green pea soup mix is packed in a waxed "Nestrite" cup container manufactured by Lily-Tulip Cup Corp.; the contents of 12 oz. cooks in three minutes and prepares one gallon of soup. The soup mix contains dehydrated powdered peas, celery, onions, carrots, parsley, potatoes, vegetable protein derivative, artificial seasoning, salt and spices.

Yeast Tablets

FLEISCHMANN'S B-vitamin yeast tablets are being introduced in the New England market by Standard Brands, Inc. The new tablets, result of long research by the Fleischmann laboratories, are designed for consumers who do not take fresh yeast because of the taste. Two of the tablets, which are easy and pleasant to take, are equal to a whole cake of Fleischmann's fresh yeast in vitamin B_1, vitamin B_2 and niacin.

A handy pack that can be carried in the pocket or purse contains 12 tablets in a cellophane wrapper. The new tablets are not for use in baking; for this purpose and for those who prefer to take fresh yeast for vitamins, the familiar yeast cake with the yellow label will continue on sale.

S-T-R-E-T-C-H
Man Hours

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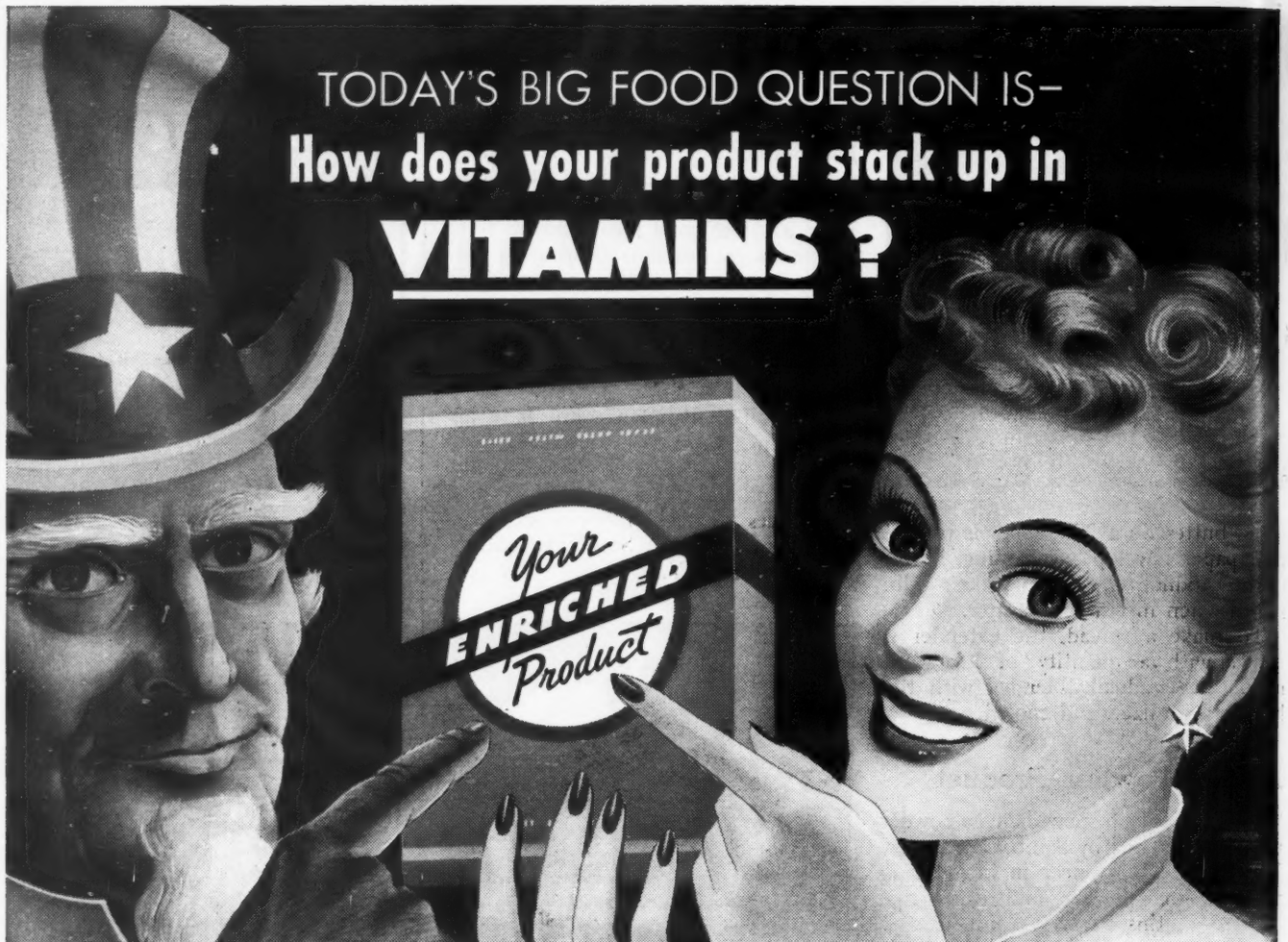


High Nutritional Value is a War-time Necessity!

To boost your sales (or even maintain them), today more than ever, *it pays to enrich!*

Whether it's Uncle Sam buying for our boys on the battle front, or Mrs. Consumer buying for her family on the production front, today all eyes are focused on the nutritional value of your products.

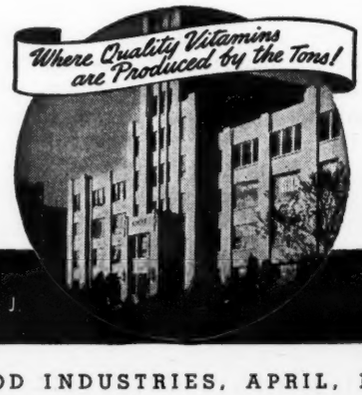
Today your products must have high nutritional value! They must justify their right to precious cargo space—their right to a place in the rationed family market basket. And one of the main points by which they are judged is *vitamin* content.

So if your products don't stack up in vitamins—if you have lost vitamins in processing — don't let somebody else's products push yours out. Instead, give serious thought to enriching.

You have seen what enriching has done for the sales of white bread, family flour, cereals, etc. And you know the emphasis Uncle Sam, nutritional authorities and housewives are putting on these foods today.

So don't risk present sales and your after-the-war future by lagging on enrichment. Find out today which of your products, in the eyes of nutritional authorities, should be enriched. Then—with enriching costs down to a mere fraction of what they used to be—go ahead and give your products the firmest possible nutritional foundation.

We will gladly advise you and give full technical information—how to enrich, the new low costs and the many benefits to you. We pioneered in vitamins and today are furnishing a goodly percentage of the nation's vitamins B_1, B_2 and C requirements. Write us for the latest sales-enriching vitamin facts today.



Hoffmann-La Roche, Inc. VITAMIN DIVISION
ROCHE PARK · NUTLEY · N. J.

FOOD INDUSTRY NEWS

GENERAL NEWS • TRENDS • MEN • JOBS • COMPANIES • APRIL, 1943

Price-Support Plan Set Up To Increase Food Output

Canners to pay farmers more, then CCC will buy vegetables from canners and resell at 1942 prices

To INCREASE the production of food on farms this year, the government last month announced a new price-support program which will operate through the processors to assure farmers 20 to 50 percent higher prices than last year. At the same time the program will hold down the ceiling prices to consumers and yet protect canners against loss because of the increased cost of raw materials.

Canners participating in the program will pay growers not less than the 1943 support prices announced by the Department of Agriculture. The crops for which these prices will be established include tomatoes, sweet corn, snap beans, green peas, lima beans, beets, carrots and cabbage for kraut. Commodity Credit Corp. will buy the raw materials from canners at the support prices and will resell them to the canners at the 1942 prices. Where the 1943 ceiling prices are adjusted to reflect the increased cost of materials to the canner, the CCC resale prices will be adjusted accordingly.

OPA will set flat dollars-and-cents prices for the "supported" canned vegetables. These prices will be by regions and will be determined by grades, can sizes, types and styles. The prices have been built up from last year's average raw material costs by regions, plus other canning costs adjusted for known increases over 1942, and include a profit margin based on canners' returns during 1941. Calculated on this basis the new ceiling prices will remain at approximately the same average level as prevailed in 1942 under the individual ceiling prices which were in effect then, although some will be higher and some lower.

For the purpose of resale to the canner, the price for the raw material will be based on the average 1942 season price paid by canners in the regions set up by the OPA in establishing price ceilings for 1943. The resale prices will apply only to that portion of the crops used for processing for the civilian trade. For the quantities processed during government reservation orders for the military and other government needs, OPA will provide separate ceiling prices reflecting the increased cost of the vegetables used in canning, as well as other known increased costs.

In "hardship" cases, individual canners will be reimbursed on the portion of their pack for the civilian trade for increases in costs other than those included in the ceiling price, upon a showing that the canner cannot absorb the increased costs and maintain a fair and equitable margin.

In addition to the program covering the major portion of the canned vegetables OPA has outlined a general program for asparagus and the remaining minor vegetables for 1943. Asparagus will be priced on a flat dollars-and-cents basis by regions, and dollars and cents prices will be set for spinach. Prices for the remaining vegetables will be established by allowing canners to increase their individual maximum prices as established for the 1942 pack of each vegetable by an amount to reflect the increased costs of the raw material, not to exceed 10 percent of the price paid for the raw commodity in 1942.

War Effort Will Be Theme of IFT Meeting

FOOD TECHNOLOGY'S actual and potential contribution to the war program will be the central theme of the fourth annual meeting of the Institute of Food Technologists, to be held in the Hotel Statler, St. Louis, June 2-4. The program for the technical sessions is being prepared by Paul F. Sharp, Golden State Co., Ltd., San Francisco, and his program committee.

Under the chairmanship of E. H. Harvey, the local arrangements committee has prepared for entertaining registered members at the St. Louis Municipal Opera on the evening of June 2. The annual banquet will be held on the evening of June 3, at which time the Nicholas Appert Medal Award will be made.

BECOMES WPB EXECUTIVE

Donald D. Davis, president of General Mills, Inc., Minneapolis, has been made Vice-Chairman for Operations of the War Production Board. He joined the staff of WPB last November and had been serving as Director of the Program Bureau.

Workers in Food Plants Classed as Essential

FOOD PROCESSING is an essential industry, and local draft boards have been so advised by the War Manpower Commission, it was announced on March 5. Consequently, employees in the food processing industries are entitled to consideration for deferment.

Under the list of food processing industries, the WMC included the following:

Meat packing and slaughtering (including poultry) and the production of butter, cheese, milk, eggs, canned or preserved fish, and nuts; canned or preserved fruits, vegetables and juices; soups; flour and other grain mill products; prepared feed; starch, cereals, rice; bread and other bakery products; sugar; leavening compounds; corn sirup; edible fats and oils, and dried, dehydrated, frozen and other special processed foods.

Nabisco Wins "E" Award

ON MARCH 12 the New York plant of National Biscuit Co. received the Army-Navy "E" pennant and award for excellence in war production, particularly in developing field biscuits for the Army C ration and K ration. Over 4,000 Nabisco employees attended the presentation ceremony and received their "E" pins.

New Container Orders Issued

Recent changes in packaging requirements affect nearly all foods

ABOUT the only area in the container field that has not been thoroughly worked over by WPB's Container division since the first of the year is packaging material for the frozen food producer and the dehydrator.

Conservation Order M-81, the tin can order, was amended late in February. Condensed milk cans were changed in size to 14 oz. instead of 15 oz. as previously required. Because no satisfactory substitute package had been developed, the manufacture of reusable 5-gal. tin cans for packaging liquid edible oils was permitted in 1943 up to 50 percent of the manufacturers' 1942 production.

The same amendment to M-81 also permitted bacon to be packed in 24-oz. cans for Lend-Lease shipment and butter, oleomargarine and citrus concentrates to be packed in No. 10 cans for the same purpose.

In March another amendment to M-81 directed the use of No. 10 cans to the greatest possible extent in packing foods for the armed forces, Lend-Lease and other government agencies.

Outside shipping containers for foods and other essential items were given high preference ratings when Order P-140 was issued. This order covers wooden containers made of lumber, veneer, plywood or staves and containers of corrugated or solid fiber and includes their parts.

Specifications for packing materials for overseas shipment made their appearance the first of March. These do not apply to subsistence items, but the reasons for getting out the specifications for war material other than food apply equally well to food items.

It was found, and found the hard way, that peacetime methods of packing for export will not take the hard handling and storage in the open that is so often imposed by wartime conditions. The result was the new specifications (USA Spec. No. 100–14A, and USN Spec. 39P16a, issued Feb. 15, 1943) which have been adopted by eight government agencies, covering all types of containers and packaging materials for war equipment and Lend-Lease shipments abroad.

Food processors may look for the release of similar specifications for their industry.

At the middle of March it appeared that the first overhaul of order L-239 further standardizing paperboard boxes would soon be announced. The same could be said for the long expected revision of order L-103 further standardizing the glass containers that may be used.

NRC Forms Committee On Food Composition

TO COLLECT, coordinate and appraise food composition data, a committee on food composition, with Dr. C. A. Elvehjem as chairman, has been organized by the National Research Council's Food and Nutrition Board. This committee is to act as the repository and point of dissemination for authentic data on all foods being used or considered for use by all branches of the military services.

Harris & Ewing

DEHYDRATED LEND-LEASE LUNCHEON

Nothing but dehydrated foods was served at a luncheon marking the second anniversary of Lend-Lease, held in Washington on March 11. These foods were of the type shipped to Lend-Lease countries. The luncheon was attended by more than 750, including ambassadors and ministers of the United Nations. The total weight of the food for the entire luncheon was less than 300 lb. Shown in the picture, drinking a dried-milk toast, are (left to right) Russian Ambassador Maxim Litvinov; Vice-President Henry A. Wallace; Lend-Lease Administrator Edward R. Stettinius, Jr.; Dr. T. V. Soong, Chinese Foreign Minister; and Lord Halifax, British Ambassador.

Control of M-86 Transferred

Revisions made in canned food order; civilians will get more of 1943 pack

IN TAKING over the administration of orders M-86, M-86-a and M-86-e the Department of Agriculture made some minor changes that will result in a larger percentage of the 1943 pack being available for civilian use than was the case with the 1942 pack. Under the terms of the new order, using the 1942 pack as the base, a greater percentage of grapefruit juice, orange juice and pineapple juice must be set aside for the government, but a smaller percentage of other fruits and juices are reserved. Changes in the amount of vegetables reserved are estimated to mean an additional 10,000,000 cases for civilians.

The amounts of the 1943 pack to be reserved expressed in percent of the 1942 production for M-86-e and FDO No. 22.2 are as follows:

Canned Product	M-86-e Reservation	FDO 22.2 Reservation
Apricots	66	60
Fruit cocktail	71	64
Grapefruit juice	46	58
Orange juice	21	45
Peaches	63	55
Pears	65	60

A comparison of the amounts of vegetables to be reserved under M-86-e and FDO 22.3 expressed in percent of the 1942 pack are:

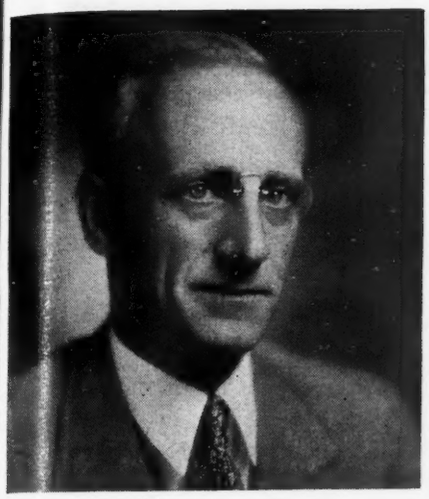
Canned Product	M-86-e Reservation	FDO 22.3 Reservation
Asparagus	49	43
Lima beans	56	37
Snap beans	58	38
Beets	84	100
Carrots	100	130
Sweet corn	42	40
Tomatoes	49	40

Fruits and vegetables whose reservation percentage has not been changed have not been included in the table.

Davis Put in Control of Food

Replaces Wickard as Food Administrator. Is responsible to the President

APPOINTMENT of Chester C. Davis to the position of Administrator of Food Production and Distribution put food in the control of a man with a broad view of the whole program rather than into the hands of a man who could speak only for one faction or pressure group. As this issue of FOOD INDUSTRIES went to press it was too early to tell the effect of this move. Washington was undecided as to whether the President had deliberately muddled the situation to slow down Congressional critics who were attacking him through the



HEADS WAR FOOD COMMITTEE

Clarence Francis, president of General Foods Corp., New York, is chairman of the Food Industry War Committee, set up by food trade groups to assist in the promotion of the nation's wartime food supply. The committee opened offices in Washington on March 8.

Secretary of Agriculture or whether it was an admission by the White House that Mr. Wickard had made such a mess of his assignment that he could not extricate himself. The latter was the generally accepted view.

The Executive Order split the Department of Agriculture, giving Secretary Wickard control of the Farm Credit Administration and of the old-line bureaus of the Agricultural Research Administration under Dr. Auchter, where there have been no administrative problems. Mr. Davis was given the rest—plus the headaches—and made directly responsible to the President.

Powers conferred upon Mr. Davis by the Executive Order of March 26 are slightly less than those exercised by Mr. Wickard. Some friends of Mr. Davis feel that he was handed a hot potato. But others point out that with Mr. Davis in the saddle, the control of food is in the hands of an experienced government executive and long-range planner. This group expects a further grant of power that will give the Administrator complete control over the food program.

Change Dried Egg Specifications

SINCE the March issue of FOOD INDUSTRIES went to press with the story on tentative Army specifications for dried eggs (page 52), the Chicago Quartermaster Depot has issued Specification No. 117 on dried eggs, released March 4, with several revisions in the text. The new specifications will be published in an early issue of FOOD INDUSTRIES.

A little care will keep the Gremlins out . . .

Gremlins just love to get into machines that have been improperly lubricated. And do they go to town when they find a machine that's being run by an insufficiently instructed operator! We've made all of our wrapping machines as gremlin-proof as possible. We've even guarded against a certain amount of carelessness. But in these days, when machines just can't be replaced, one has to take extra care.

See that operators know the machine thoroughly. Especially important now, when old hands must often be replaced.

Clean regularly. A clean machine works better, and the operator takes pride in it—gives it better care.

Lubricate at regular intervals—and see that the right lubricants are used.

Inspect regularly. Timely tightening up or adjustment, and replacement of worn parts will help prevent breakdowns.

Get authoritative advice when you need it. If in doubt about the care of any part of the machine, ask us. We may be able to save you valuable time and expense. If, in spite of all, the Gremlins do get in, we'll do our best to give you prompt assistance.

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Food Administration Orders

Cheddar Cheese—Manufacturers of processed cheddar cheese will be allowed to count each 100 lb. of this product sold to designated government agencies as 95 lb. of the cheese required to be "set aside" under Food Distribution Order 15. War needs call for substantial quantities of processed cheese for special uses, but under the terms of the order, processed cheese was not included in the 50-percent set-aside portion. This statement was issued by Wickard's office on March 2.

Edible Oils—Movement of peanut, soybean, cottonseed and corn oils into commercial channels will be controlled on a monthly allocation basis, effective April 16, under terms of Food Distribution Order 29. Each month an allocation of each of the four oils will be made according to civilian and war agency requirements. Permits to ship or receive must be obtained by the buyers and sellers.

Peanut Oil—On February 27 Secretary Wickard issued an amendment to Food Distribution Order 14, retroactive to February 5, which clarifies the disposition of peanut oil reserved for war uses. The disposition of the 25 percent of the peanut oil set aside at the point of refining to assure adequate quantities for essential war uses will now be determined by the Director of the Food Distribution Administration. This authority prior to the amendment was vested in the Commodity Credit Corp., which will continue to purchase peanut oil in accordance with the terms of the order.

Cocoa Beans—Secretary Wickard on March 5 issued Food Distribution Order 25, regulating the grinding of cocoa beans and restricting the manufacture of chocolate novelty items and other cocoa products, succeeding WPB Order M-145 as amended. In Food Distribution Order 25.1, issued the same day, quotas of cocoa beans that may be used for processing are fixed for each quarter at 60 percent of the amount processed by each producer during the corresponding period of 1941.

Meat Packers—On March 5, three Food Distribution Orders were announced affecting livestock slaughterers and meat processors. Food Distribution Order 26, effective March 31, requires all livestock dealers to obtain permits to buy and sell livestock and to keep complete records of their operations. Food Order 27, effective the same date, requires all livestock slaughterers who sell meat, including farmers and local butchers, to operate under a slaughter permit system and to stamp their permit number at least once on each wholesale cut.

Food Order 28, a reservation order, effective March 5, requires all slaughters operating under Federal inspection to set aside for war uses certain designated percentages of their production.

Restrictions on Canned Foods—Termination of Food Distribution Order 24 as of March 1 was announced by the Department of Agriculture, eliminating restrictions on the movement between canner and retailer of 69 canned fruits, juices and vegetables. Under rationing, retailers and wholesalers will receive their supplies of these canned goods in exchange for ration coupons or certificates.

Citrus Fruits—An amendment to Food Distribution Order 6, issued on February 24, allows California and Arizona orange handlers more flexibility in meeting their weekly reservation requirements. The amendment provides that if a handler sets aside or diverts to processors more fruit during a week than is required under the order, he may take credit for this excess amount in some future week. Under the original order, a handler was not permitted to take credit later for fruit set aside in excess of the amount required.

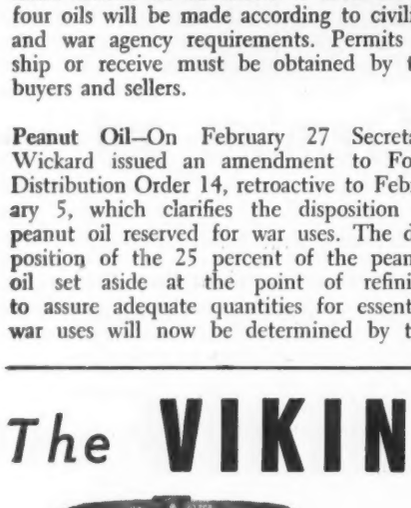
Canned Fish—Food Distribution Order 23 governing allocations of salmon, pilchard, Atlantic sea herring and mackerel packed from March 1, 1942, through February 28, 1943, was amended on March 1 to have those allocations apply also during the month of March 1943. As in the past, 60 percent of the salmon packed by a canner in March 1943 must be delivered to the government, and the remainder released to the civilian trade for later distribution.

Bread Slicing—Amendment 3 to Food Distribution Order 1, issued March 8, permits bakers to resume the slicing of bread and rolls generally as well as for restaurants, hotels, institutions and commissaries for service with meals. The original restriction against sliced bread was rescinded because savings of waxed wrapping paper were not as great as expected, and the disadvantages of the order seemed to outweigh the advantages. The amendment continues the requirement that only one thickness of paper may be used for wrapping bread and rolls.

Canned Fruits, Vegetables—Three amendments to Food Distribution Order 22, issued February 19, clarify distribution and quota restrictions on canned fruits and vegetables. Amendment 1 to Order 22 transfers administration of WPB Order M-86-e, which specified the percentages of fruits, juices, and vegetables to be reserved from the 1942 pack, to the Department of Agriculture. The new order contains the same regulations as the WPB order.

Amendment 2 to the order provides for the reservation for government purchase of certain percentages of the 1943 pack of canned fruits and fruit juices, based on the actual 1942 pack. Amendment 3 provides for the reservation for government purchase of certain percentages of the canned vegetables packed in 1943.

The VIKING PEELER



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Carrots and Beets — Turnips and Yams

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50 to 60 lbs. per minute—1,000 lbs. per hour
70 to 75 lbs. per minute—1,400 lbs. per hour

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Waste reduced to absolute minimum—and recoverable for cattle feed. Most economical in first cost, operation, maintenance and space.

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NUTRITIONIST HONORED

The 1943 Pittsburgh Award, bestowed annually for outstanding achievement in chemistry by the Pittsburgh Section of American Chemical Society, has been presented to Dr. Charles Glenn King, scientific director of the Nutrition Foundation, New York. Dr. King isolated and identified vitamin C and has done notable work on enzymes and on the structure of fats and sugars.

Government Will Buy SO_2 Strawberries

SULPHUR DIOXIDE-PACKED strawberries will be purchased this summer in southern and southwestern states to meet war export requirements. The purchase program will be similar to that of last year when 21,739,000 lb. of processed strawberries were purchased. The berries are packed in 50-gal. white oak barrels and preserved by adding the sulphur dioxide solution. They will be sent to the Allies to be made into jams—primarily to take the place of the spreads made from fats and oils, such as butter, that are in short supply.

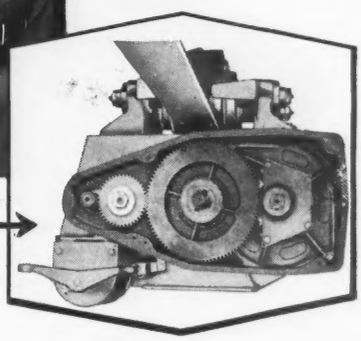
IFT Has Two New Sections

CHARTERS have been granted to two more local sections of the Institute of Food Technologists. The New York Society of Food Technologists is now the New York section of the IFT, with D. J. Maveety, National Biscuit Co., as chairman. The other officers are Stroud Jordan, American Sugar Refining Co., vice-chairman; G. L. Montgomery, *Food Industries*, secretary; and R. F. Light, Fleischmann Laboratories, treasurer. A. G. Olsen, General Foods Corp., is section councilor.

The other new IFT local is the St. Louis section, with E. H. Harvey, Anheuser-Busch, Inc., as chairman. The other officers are H. C. Schaefer, Ralston-Purina Co., vice-chairman; K. L. Cartwright, Anheuser-Busch, Inc., secretary, and J. W. Evans, Union Starch Co., treasurer.

Speed WARTIME Food Output WITH R & M ELECTRIC HOISTS!

Here's what Rex W. Perry, president of the Perry Food Products Co., says about this R & M Hoist. "With an absolute minimum in maintenance, our R & M Hoist has always performed perfectly. It is an indispensable aid in speeding production of food for our country and allies."



JUST REMOVE THE COVER and the entire hoisting mechanism may be quickly withdrawn! Note the extreme simplicity and precision engineering. Compactness provides utmost headroom and increases lift.

Up-to-the-minute food plants everywhere—of which the Perry Food Products Co. is a typical example—are *increasing* their production of vital foods for home and abroad with R & M Electric Hoists. Why not enlist their capable help to speed *your* lifting and conveying operations?

They give "airline speed" to production lines because they are fast and efficient. Because they handle loads from any angle with perfect balance. Because they're *engineered* to deliver trouble-free, 24-hour service, year in and year out. Because they guarantee the utmost in utility, power and safety—yet require a minimum in overhead space.

Whether you require capacities of 1,000 or 15,000 lbs., there's an R & M Electric Hoist *tailor-made* for the job; and it can be equipped with special trolleys to fit any type of monorail. Where greater distances of movement and high-speed transportation are essential, investigate R & M's complete line of Motor-Driven Trolleys.

The following R & M Food Hoist distributors, or your nearest R & M sales and service office, will be glad to furnish complete details. Or write for factual Bulletins 6161A and 7171A.

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OPA Price Regulations

Canned Oyster—The recent rise in prices of canned Eastern and Gulf oysters brought a reply from OPA in MPR 328, issued February 17, placing ceilings for sale and delivery of the products. The maximum price provisions did not apply to the sale of the oysters to a purchaser if prior to February 23, 1943, such canned oysters had been received by a carrier.

Frozen Fruits, Berries, Vegetables—Amendment 3 to MPR 207, issued February 17, determines the method of calculation of maximum prices for frozen fruits, berries and vegetables packed in a container type or size of which the packer made no sales during the first 60 days after the beginning of the 1941 pack. The regulation was made to cover all container sizes not previously included in the original order.

Live Poultry—Specific price margins between grades of live poultry were established on March 16 in amendment 6 to MPR 269, to prevent upgrading in those commodities. Maximum prices at wholesale for Grade B live poultry were set at 1½ cents per pound below the specific top Grade A ceilings named in the live poultry regulation. Grade C ceilings were fixed at 4 cents a pound below Grade A. At the same time the method of grading ducks was revised, and 13 other changes were made in the poultry order.

Molasses—Sellers of cane backstrap and beet sugar final molasses electing to price their carload lot sales on the basis of March sales under GMPR instead of under the alternative prices embodied in Supplementary Regulation No. 14 to that order, were asked to price their less-than-carload lots under the same method, in amendment 130 to Supplementary Reg. 14, issued March 13. The same ruling applies to tank carload sales.

Citrus Fruit Sales—Amendment 2 to MPR 292, issued March 5, further regulates the freight and refrigeration services performed by packers and common carriers of citrus fruits. In determining actual costs and charges for precooling, initial icing and refrigeration services incurred by any person, such actual costs and charges may be included as part of freight regardless of whether the services are performed by a common carrier, a packer or any other person.

Pork Cuts—OPA on March 5 issued MPR 336, effective April 1, fixing dollar-and-cents ceilings on all retail sales of fresh and processed pork cuts. The country is divided into 11 zones and different ceiling prices are fixed for sales made in each zone.

Frozen Lake Smelts—Maximum prices for frozen lake smelts were announced on March 6 in MPR 337, placing ceilings on all sales and deliveries of the product except to purchasers unless the smelts were received by a carrier prior to March 12, 1943.

Pitted Prunes—To facilitate the movement of pitted prunes which are used in substantial quantities for Army K rations, OPA on March 13 issued Amendment 2 to MPR 227 setting specific maximum prices at which the prunes can be sold to processors.

Canned and Preserved Foods—During the first part of March several regulations and

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GOVERNMENT'S FOOD ADVISORY COMMITTEE

Secretary of Agriculture Claude R. Wickard, seated, and the other men who make up the government's Food Advisory Committee. Secretary Wickard is chairman, and the other members are, left to right, Edwin W. Gaumnitz, Board of Economic Warfare; Roy F. Hendrickson, Food Distribution Administrator; M. Lee Marshall, War Production Board; Gen. C. A. Hardigg, War Department; Edward R. Stettinius, Jr., Lend-Lease Administrator; Capt. E. F. Ney, Navy Department; and Dewey Anderson, State Department. Dr. Russell M. Wilder, Food Distribution Administration, was appointed to the committee on March 23.

amendments were issued on canned and preserved foods. An amendment to MPR 207, issued March 9, adjusts ceiling prices from frozen fruits, berries and vegetables. MPR 226, amended March 9, establishes new ceilings for fruit preserves, jams and jellies, to allow for seasonal variation in sale of the products. Seasonal conditions and other factors affecting the sale of apple butter made necessary an amendment to MPR 232, issued March 9, adjusting maximum prices. Amendment 2 to MPR 233, issued March 9, re-defines some of the terms of the maximum price ruling on dried and canned apples and apple products, and adjustments in the ruling on canned fruits and berries (MPR 187) were made in amendment 7, issued on the same date. A redefinition of terms was also given in amendment 8 to MPR, regarding ceilings on canned vegetables.

OPA Tightens Control Over Food Prices

CARRYING out its rapidly broadening program of maximum price ceilings on food commodities. Price Administrator Prentiss Brown's office clamped ceilings on a wide variety of products during the month. Among the foods affected by the rulings were corn, 5 fresh vegetables, lettuce and spinach, salt-cured herring, soybean, cottonseed and peanut oil meals and cakes, Georgia cane sirup, canned Texas grapefruit juice, butter, eggs and certain sausage products. OPA also authorized the regional administrator in the west coast district to issue a dollar-and-cents retail beef regulation, and established specific maximum prices at which the Commodity Credit Corp. may sell to the trade imported bulk tea.

During the month OPA granted to its regional offices the power to adjust the maximum price of any seller of fresh lettuce, spinach, carrots, green peas, snap beans, tomatoes and cabbage when the ceiling is higher or lower than others generally prevailing in the area. All sales and deliveries of dried whole eggs to government purchasing agencies after February 28, 1943, were exempted from price control.

Dehydrated Vegetable Production Skyrockets

DEHYDRATED vegetable production is expected to take a sharp upswing by July 1 of this year, when 187 additional vegetable dehydration plants, with an estimated capacity of 200,000,000 lb. annually, will be geared to full production. For the most part these new vegetable dehydration plants are canneries or other food processing plants that have been converted to this new method of preserving food.

Handful of... HEADLINES!

Food is front page news these days. Almost as important as battles are war-born revolutions in dehydration, de-bulking, quick-freezing.

Tomorrow's methods, moulding your products now, mean changes all down the line. Changes in *cleaning* techniques . . . both of raw materials and equipment . . . to meet the all-out pressure of the nation's needs.

Half a century of serving the food industry has prepared Wyandotte to help you keep your cleaning processes abreast of "headline" developments. Complex or commonplace . . . *whatever* your problem . . . our laboratories, experts, and roving Service Representatives stand ready to offer a solution. One that may well save you time and money, too.

We invite you to write Wyandotte for detailed information about every aspect of food equipment cleaning . . . as in canneries, packing plants, and de-hydrating plants. And try Wyandotte Steri-Chlor . . . a safe, effective germicide, invaluable sanitation safeguard.

Wyandotte

Service Representatives in 88 Cities

WYANDOTTE CHEMICALS CORPORATION

J. B. FORD DIVISION—WYANDOTTE, MICHIGAN

War Production Board Orders

Closures for Home Canning—In an amendment to Order M-104, issued March 15, WPB removed all quota restrictions on the manufacture of certain types of metal lids used to seal glass jars in home canning. Plenty of rubber jar rings are also made available to housewives. The amendment opens the way to manufacture of about 634,000,000 of a new type closure for glass pack this year, and the whole program will provide closures for a home-canning pack of 5.2 billion jars.

The document was restated in Amendment 1 to M-104, issued March 24 which made minor changes in the closure-material quotas for home canning.

Sheep Intestines—A measure to increase the supply of sheep intestines for use in making surgical sutures was made in an amendment to Order M-220, issued February 24. Purchase orders for sheep intestines for such use must now be filed by all packers in the country who slaughtered more than 1,000 sheep last year before they can make deliveries of sheep intestines for other purposes.

Wooden Shipping Containers—WPB Order L-232, issued March 1, standardizes and simplifies wooden containers for shipping fresh fruits and vegetables. The order will eliminate odd and fancy containers and special containers designed for only one use, reducing the types of containers from several hundred to 72, including eight types of hampers, baskets and berry cups and 64 types of boxes and crates. Marking or painting boxes in such a way as to limit their reusability is prohibited.

Specialty Wrapping Papers—Nonessential uses of certain specialty papers used in wrapping, specifically glassine, greaseproof and vegetable parchment, were prohibited on March 17 in Order M-286. Food wrappings affected include those for canned and bottled goods and candy products when used as an overwrap or liner, in conjunction with any other greaseproof, cellophane or similar transparent wrapping material derived from cellulose.

Cork Insulation—WPB order M-8A as amended February 20 now permits cork to be used for roof insulation for the installation of air conditioning equipment and all non-war purposes previously banned under the mandatory priority control placed in effect by the WPB in June 1941. The new order, made possible because of the unusually large stockpile of cork in reserve and increased shipments arriving from the Mediterranean area, does not end the allocation system, but monthly allocations of cork appear to be adequate for all military and civilian needs for corkboard insulation and for cork covering to be used on cold lines.

Containerboard—Order M-290, issued March 2, restricts production and distribution of kraft or jute containerboard because of a shortage in the supply of materials, and establishes a "reserve production" for mills turning out the products. Twenty-five percent of the total tonnage of each mill's projected supply of containerboard must be reserved for shipment at the direction of the Director General for Operations.

Building Maintenance, Repair—A new definition contained in an amendment to Order L-41, issued February 20, on building maintenance and repair, specifically designates that where a single job is partly maintenance and repair and partly new construction, the whole project will be considered new construction and subject to L-41. The amendment reduces to $200 new construction which may be undertaken, without specific authority, by a number of manufacturing enterprises, including buildings for the manufacture of beverages (except milk), candy or chewing gum.

Can-Making, Closing Machinery—Restrictions on shipment of certain types of industrial equipment frequently leased to users are clarified by an amendment to Order L-83, issued March 12. The original order by implication required ratings of A-9 or higher before any movement could be made of can making and closing machinery. However, the amendment explicitly permits the lessor to recover his machinery from the lessee on the termination of the lease.

THIS PUMP IS NOISY . . . SEEMS TO HAVE SLOWED DOWN
CHECK ALL PIPE CONNECTIONS! . . . BE SURE THERE ARE NO LEAKS!
NUMBER THREE OF A SERIES

How To Get The Most Work Out Of Your VIKING PUMPS

For efficient operation of Viking Rotary Pumps it is essential that all pipe lines be tight. Use shellac, glycerin-litharge or some other good compound in making up your pipe joints. Periodical inspection of your suction line is important. A small air leak will decrease your pump capacity and cause it to be noisy. Check all pipe joints and unions frequently; also the packing in your swing joints and valve stems.

Get *extra* wear out of your Viking Pumps by giving them *extra* care. The Viking Service Manual tells you how. It's a handy, illustrated booklet giving you practical help in mounting, operating and maintaining Viking Pumps. Write for your copy today. It's FREE.

VIKING PUMPS — FIRST IN AMERICA

VIKING Pump COMPANY CEDAR FALLS, IOWA

Research Support Continued

GRANTS for the coming year totaling $148,500 have been authorized by The Nutrition Foundation, Inc., to support research projects. Following recommendations made by the Foundation's Scientific Advisory Committee, the grants included $110,700 for the renewal of 28 projects supported by the Foundation during 1942 and $37,850 for 15 new research projects.

Dr. Sherman Heads New Bureau of Nutrition

TWO AGENCIES in the Agricultural Research Administration have been consolidated to form a new Bureau of Human Nutrition and Home Economics, with Dr. Henry C. Sherman as chief. The agencies consolidated are the old Bureau of Home Economics, and the Division of Protein and Nutrition Research of the Bureau of Agricultural, Chemistry and Engineering.

This new set-up will facilitate the immediate expansion of the nutrition and food research of the Department of Agriculture, a wartime need.

Tell New Facts of Cereal Chemistry

Five years' research reviewed at meeting of Institute of Cereal Chemistry

To REVIEW results of research studies in cereal chemistry during the past five years, the University of Minnesota held the second session of its Institute of Cereal Chemistry at the Continuation Study Center, February 25 to 27.

Current problems arising from meeting wartime demands for alcohol was the general subject of a lecture by Dr. Paul Kolachov, Joseph E. Seagram & Sons, Inc., Louisville, Ky. Wheat and granulated wheat flour are suitable for alcohol plants not equipped with recovery systems for distillery wastes, but foaming, fouling of evaporators and screens, and low residue yield for feeds, discourage the use of granular flour in plants equipped to handle corn and mixed grain wastes.

Dr. John S. Andrews, General Mills, Inc., research laboratories, denied that wheat germ is the best source of thiamin in wheat. Berry tissue close to the germ as well as the germ is rich in thiamin. The riboflavin content of wheat is found most abundant in the germ, while niacin and pantothenic acid are concentrated in the bran.

Reporting on classical research studies of the starch molecule, Dr. R. M. Hixon, Iowa State College, stated that fractionation of starch into at least two distinct types of molecules had caused a revolutionary change in starch chemistry within the past three years. He cited evidence that the amylose and amylopectin fractions are distinct.

Amylose molecules are chains of 150 to 500 glucose units, which crystallize easily into parallel chains, form complexes with alcohol or iodine and are digested almost completely with β-amylase.

Amylopectin molecules are large branches containing about four times as many glucose units as amylose (1,000 in the case of corn) and do not easily crystallize or retrograde but occur in waxy starch in crystalline form with same X-ray pattern as amylose. Branches occur for every 25 glucose units to give chains too short for stable helical configuration with alcohol or iodine. Amylopectin digests only partially with β-amylose and varies in phosphorus content.

Deep-drawing made it light and strong enough to fly

This cylinder, a reservoir of hydraulic energy for aircraft use, is another example of the way in which the Hackney Deep-Drawing Process helps manufacturers strengthen and reduce the weight of parts simultaneously.

Hydraulic energy to feather propellers, operate landing gear, flaps, etc., requires accumulators which are light in weight, yet are strong enough to withstand high internal pressures.

Hackney Drums and Barrels

This is but one of the many products developed by Hackney engineers to meet the exacting requirements of wartime service. Hackney production today is 100% for war. Hackney Drums and Barrels are being used by hundreds of war plants to solve their transportation and storage problems for vital foods. Hackney Containers are, therefore, helping to hasten the day when they will again be benefiting all industry.

And when that long-hoped-for day arrives, peacetime transportation and storage facilities will benefit by the things learned in this war. For instance, from the research and experience of Hackney, will come better, high quality containers for gases, liquids and solids.

Pressed Steel Tank Company

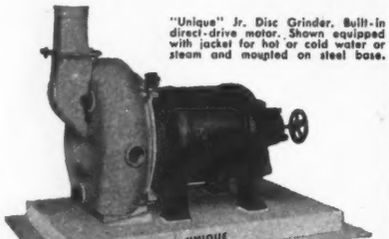
General Offices and Factory · 1457 SOUTH 66th STREET
Milwaukee, Wisconsin

DEEP-DRAWN
SHAPES AND SHELLS

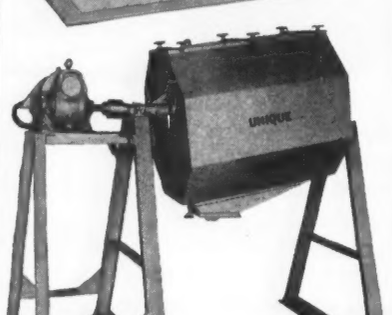
PROCESSING EQUIPMENT FOR WAR INDUSTRIES

Robinson Engineers are at your service! Avail yourself of their experience and of the facilities of our modern testing laboratory. Illustrated catalogs on request for any "Unique" equipment.

"Unique" Saw Tooth Crusher. Special grade steel saws, mounted in roller bearings. Heavy-duty balance wheel carries intermittent shock load.



"Unique" Jr. Disc Grinder. Built-in direct-drive motor. Shown equipped with jacket for hot or cold water or steam and mounted on steel base.



"Unique" Tumbling Prism Mixer. Driven by gearhead motor. For handling dry powders that cannot stand much agitation. All-steel welded frame.

"Unique" Gyro-Sifter. Motor driven. With telescopic hopper for efficient, continuous feeding of dry powders.

"Unique" Mixer. All-steel welded . . . extra large. Equipped with cold water jacket, mixing inlet and two inspection doors. Solid stainless steel construction.

Firms with war contracts have immediate priority on our complete engineering and manufacturing facilities.

ROBINSON MANUFACTURING COMPANY

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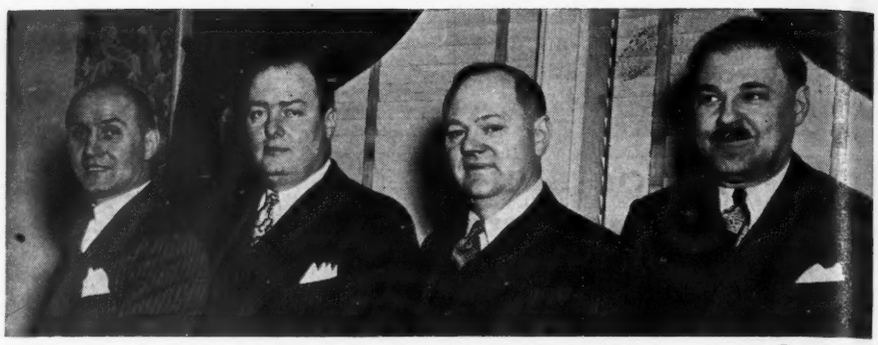
30 CHURCH STREET, NEW YORK



BAKERY ENGINEERS ELECT OFFICERS

American Society of Bakery Engineers has elected as president for 1943 Willard H. Geller of the John R. Thompson Co., Chicago (third from left). The other officers are first vice-president, Albert J. Faulhaber of the American Stores Co., Philadelphia (second from left); second vice-president; Arthur E. Grawert of Pillsbury Flour Mills Co., Minneapolis (left); and secretary-treasurer, Victor E. Marx of American Dry Milk Institute, Chicago (right).

Bakery Engineers Tell How To Make Equipment Last

Recommendations given at annual convention. Stress put on more accurate control of processes

PRODUCTION under wartime conditions with emphasis on maintenance characterized the program of the 20th annual meeting of American Society of Bakery Engineers in Chicago, March 8 to 11. A near-record registration of 1,137 attended.

With an eye to the future, Ralph D. Ward, president of American Bakers Association, advised against the still too common practice of operating equipment at a greater than peacetime rate under careless and inefficient supervision.

H. S. Sharp, Union Machinery Co., Joliet, Ill., gave a particularly thorough and systematic schedule for vigilant maintenance of mixers, dividers, rounders, proofers, molders and roll equipment. He particularly emphasized proper adjustments, thorough cleaning out of all dough particles and blowing off of flour dust, systematic lubrication, ventilation and blowing out of motors, cleaning out of air filters and checking on all working parts of air compressors. Attention was also directed to the care of transmission chains and drives, gears, sprockets, packing glands, bearings, shafting and speed reducers. Dirty oil in a speed reducer bath was cited to be as bad as no oil at all. Recommendation was made that open gears be cleaned out, washed, and supplied with new grease every 30 days. Frequent cleaning with oil solvents and adjustments to avoid overtension and harmful slackness was urged for V-belts.

Representatives of other manufacturers of equipment recommended frequent painting even though only touching up, sterilization of humid areas with sodium hypochlorite solution, adjustment of relative humidity to 85 to 90 per cent with dewpoint at 95 deg. F. and elimination of live steam in bake ovens.

The Supply Situation

Ingredient materials and packaging supplies were reviewed by spokesmen for their respective industries. Making of high-ratio shortenings was reported as being discontinued in April, with likely rationing of all shortenings next year. Adequate supplies of milk solids for bakers during 1943 is assured on the basis of present regulations and supply outlook. The outlook is for abundant supplies of sugar during 1943, although shortage of manpower will adversely affect beet sugar production. Shuttle shipping of sugar from West Indies to Florida is much improved and regular supplies from Hawaii to Pacific ports was reported. The supply of frozen eggs for 1943 is likely to be cut to 80 percent of 1942 usage. Efforts are being made to get 110 percent of 1942 usage because of the increased market demand for bakery products resulting from rationing restrictions affecting home baking.

Chas. E. Riley, Red Star Yeast Co., said that because of the restrictions imposed on ingredients and procedure, the absorption of water in the doughs, time and methods of mixing, and time and temperatures of fermentation become factors of more significance than previously.

Packaging Exposition To Have War Exhibit

How FAR the packaging, packing and shipping industries have gone in aligning their activities with the war effort will be highlighted at the Wartime Packaging Conference and Exposition to be held at the Hotel Astor, New York, April 13-16. There will be an extensive special exhibit of war packages and packing and shipping methods by various government agencies as a feature of the exposition. The regular exhibitors at the exposition will show their products and services for war and for essential civilian needs.

The conference program, concurrent with the exposition, will be devoted entirely to war aspects of packaging, packing and shipping, according to American Management Association.

Citrus Juice Standards

TENTATIVE standards for grades of canned concentrated orange juice, effective March 15, 1943, were recently issued. At the same time tentative standards for canned blended grapefruit juice and orange juice were released by the Food Distribution Administration. The standards are designed to serve as a convenient basis of sale in wholesale transactions and as a basis for determining loan values on stocks in storage, and also form the basis for the Federal inspection and grading service similar to that now available on fresh and canned fruits and vegetables and other processed foods.

7 Dehydrated Foods Reserved for Army

INCREASING importance of dehydrated foods on battle fronts led Secretary of Agriculture Wickard to issue Food Distribution Order 30, effective March 21, reserving the entire production of seven major dehydrated vegetables to meet war needs. Affected by the order are all stocks and future production of dehydrated Irish potatoes, sweet potatoes, cabbage, carrots, beets, onions and rutabagas.

SCHEDULE OF EVENTS

APRIL

13-16—Packaging Exposition and Conference, Hotel Astor, New York, N. Y.

MAY

7- 8—American Society of Brewing Chemists, technical meeting, Hotel Statler, Cleveland, Ohio.

12-14—American Oil Chemists Society, 34th annual meeting, Roosevelt Hotel, New Orleans, La.

24-25—Flavoring Extract Manufacturers Association of the U. S., Hotel Pennsylvania, New York.

FAST . . . DEPENDABLE . . . SAFE

OAKITE CLEANING

Materials - Methods - Technical Service

is your best answer for doing equipment clean-up work EASIER . . . conserving manpower . . . safeguarding product QUALITY!

Whatever food product your plant is dehydrating, quick-freezing or canning . . . you know how extremely important it is to maintain processing and handling equipment in CLEAN, sanitary condition.

But remember, there is a WRONG and a RIGHT way to clean aluminum, Monel metal, copper, stainless steel, tinned, galvanized or glass-lined equipment. Take this helpful SHORT-CUT . . .

Benefit by the successful experience of others . . . use SAFE, specially designed Oakite materials that clean THOROUGHLY, quickly, economically, yet PROTECT surfaces of valuable equipment and extend its useful life.

Wartime Oakite Service *FREE!*

Whether or not you are now using Oakite materials, all our facilities and experience are freely available to you through our Technical Service Representatives . . . to help you find the RIGHT ANSWER to your sanitation problems.

OAKITE PRODUCTS, INC.
26G THAMES ST., NEW YORK
Technical Service Representatives Located in All Principal Cities of the United States and Canada

ASK US ABOUT

Cleaning Sanitary Fittings, Pumps and Piping

•

Steam Cleaning Blanchers, Scalders, Retorts, Cookers

•

Ridding Floors of Syrups, Juices, Sugar, Oil, Grease, Etc.

•

De-Scaling Water-Cooled and Water-Circulating Equipment

•

Removing Grease, Wax, Scale From Aluminum Trays, Utensils

•

Cleaning Rubber, Stainless Steel and Wire-Mesh Conveyor Belts

OAKITE MATERIALS METHODS SERVICE — Buy Bonds for Victory — CLEANING FOR EVERY CLEANING REQUIREMENT

CAPITAL VIEWS

ABSENTEES—Not all absentees are slackers. Often there are important reasons—which might and should be corrected—that keep men from their regular jobs. Each management must make inquiries and fix conditions, to eliminate as much as possible such absenteeism. This is important for patriotic reasons, as well as for selfish ones.

FOOD BUYING PRIORITY—As shortages develop, priority classes of eaters are likely to be established. Unquestionably, first will be Army and other military consumers, with something equivalent to AA classification. Then there will be a question as to whether Lend-Lease, or foreign relief, or Red Cross purchases for foreign usage will go ahead of American civilians. It is going to take a bit of skill to decide which is A and which is B. There will not be enough food for Class B eaters. Even Class A priority will have to take some kinds of food that are less than desirable.

SLICED AGAIN—The fiction that elimination of bread slicing saved a lot of money for the baker has been abandoned. When early in March bakers were again permitted to slice the bread before offering it at retail, there was in effect, but not in words, a confession that the earlier OPA ruling had been largely anti-fad in its motive. The industry and the public could have told OPA officials a lot about this if they had been willing to listen. The new OPA Administrator Brown seems much more attentive to facts. He and Wickard are much less likely to muddle in than the old group—we hope.

STANDARDS, GOOD AND BAD—Again it is definitely reiterated in Washington that canned fruit and vegetables must bear official grade standards labels this season. This is a necessary and proper correlary of ceiling prices on these goods. But much of the rest of the strong effort to compel standardization does not have comparable justification. Much of it originates merely in a desire to reform or to regiment the food industry. That should be resisted.

SYNTHETIC WEATHER—To try out food, clothing, military equipment and other things on human beings under conditions comparable to desert or Arctic or other unusual conditions, the Quartermaster Corps of the Army has established a Climatic Research Laboratory. A cold chamber resembles the stratosphere and a hot chamber simulates the worst of desert conditions, perhaps even including a sand storm. The result is that goods for the Army reach their destinations in condition to be used regardless of the vicissitudes there encountered. A bit of this sort of thing for peacetime food distribution would improve a whole lot of goods, and, still more the methods of packaging. Whenever there is opportunity, the food manufacturer will do well to investigate these Army methods and to prepare to imitate the technics for postwar purposes.

USE DATA NEEDED—To distribute many scarce materials it is required that the seller know the end use to which the materials are to be applied. Thus, for example, manufacturers of chemicals ask what may first seem very rude questions before they agree to supply their chemicals. This is required by WPB. Users of scarce materials must tell such facts or do without the wanted materials. But they can reasonably expect that the materials distributor will regard as confidential not only the quantity that they take but also the fact they take any at all for certain purposes that are of the nature of secret processes. A bit of frank cooperation is needed.

POSTWAR ADVANTAGE—He who gains now is ahead later. That is a self-evident fact which must be studied by food industries that have international problems, either those of raw material supply, markets or import competition. Uncle Sam and John Bull have divided much of the world with respect to raw-materials buying and other goods business. Primarily this affects minerals and metals. But, incidentally, it means that in some parts of the world the British industries are going to have a dominant position which will be a long head start after the war if nothing else is done about it during the period of hostilities. No one needs to rush in and expect these international arrangements to be thrown out merely to prevent a postwar problem for some food business. That would be silly. But the food industries can see to it that a parallel and appropriate activity is maintained so that they will not find themselves entirely eliminated from these foreign areas when something like normal business can again be sought.

THE "STATISTICAL MAN" – Rationing assumes a theoretical fellow who is called a "statistical man." It is taken for granted that everybody is going to be served by ration coupons just as this hypothetical individual. The result is a very bad thing. It gives just as much butter and just as many cans of fruit to folks that never bought either as it does to the apartment city dweller who has grave difficulty in doing with this part of the average ration. Any food industry which can find some alternate methods for fair and effective allotment of scarce goods will do the public and his industry a tremendous service by showing how something other than this "statistical man" can be used as the ration unit.

Baby Foods Boom

CANNED foods suddenly became quite popular after point rationing went into effect on canned foods. The reason—their point value is so low that thousands of adults decided that they like them. Even dogs and cats have become converts to junior's diet

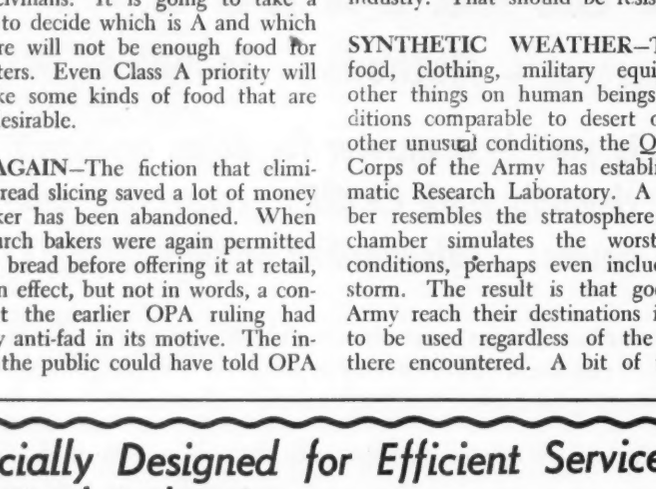
Specially Designed for Efficient Service in the Food Industries . . . . . .

GUARANTEED

TO MEET THE CONDITIONS FOR WHICH THEY ARE SOLD!

They're available in a type, material and size best suited to your needs.

Write for details; no obligation.



FREDERICK PUMPS

The FREDERICK IRON & STEEL CO.

Frederick, Maryland

Agricultural Research Bureaus Transferred

MAJOR changes in two bureaus of the Agricultural Research Administration were announced on February 23, to bring about a closer integration of related work. Agricultural engineering research, and also the research on chemical eradication and effluent contaminants, are transferred from the Bureau of Agricultural Chemistry and Engineering to the Bureau of Plant Industry, hereafter to be known as the Bureau of Plant Industry, Soils, and Agricultural Engineering.

The direction of the four regional research laboratories is transferred to the Bureau of Agricultural Chemistry and Engineering, which will hereafter be known as the Bureau of Agricultural and Industrial Chemistry.

Enriched Flour Hearing

ACTING Federal Security Administrator Watson B. Miller has announced a public hearing under the Food, Drug and Cosmetic Act on matters relating to the definitions and standards of identity for enriched flour, enriched bromated flour, enriched self-rising flour, enriched farina, and on the use of certain vitamins and minerals in enriched bread, rolls or buns. This hearing on flour standards is scheduled for April 19.

Farina Standards Upheld

STANDARDS for farina and enriched farina, set aside by the United States Circuit Court of Appeals for the Seventh Circuit, were upheld in a recent six-to-one decision by the United States Supreme Court. The lower court had held that the standards were arbitrary and unreasonable to the extent that they precluded a manufacturer from adding vitamin D to its product and marketing it as farina, or from marketing the product as enriched farina without the addition of other vitamins. The Supreme Court held that there was sufficient evidence to support the Federal Security Administrator's judgment that absence of appropriate standards would cause consumer confusion.

Meat To Be Held

ALL livestock slaughterers operating under Federal inspection are now required to set aside for war uses the following percentages of their meat: 40 percent of beef other than canner and cutter grades; 80 percent of beef, canner and cutter grades; 30 percent of veal; 35 percent of lamb and mutton, and 45 percent of their total pork inventories.

MONSANTO FOOD GRADE MINERAL SUPPLEMENTS

SODIUM FERRIC PYROPHOSPHATE

MONOCALCIUM PHOSPHATE

DICALCIUM PHOSPHATE

TRICALCIUM PHOSPHATE

DISODIUM PHOSPHATE

CALCIUM PYROPHOSPHATE

SPECIAL PHOSPHATES

IODIZED MIXTURES

These mineral supplements of exceptional purity ... and the experience of our technical staff... are at your service... to help you keep U. S. strong for the stern tasks ahead.

As the nation's largest producers of elemental phosphorus—from which our phosphoric acid and food grade phosphates are derived—Monsanto is in an excellent position to be of real help in your food fortification problems. For samples or the assistance of our technical staff, inquire: MONSANTO CHEMICAL COMPANY, Phosphate Division, St. Louis, Missouri. District Offices: New York, Chicago, Boston, Detroit, Charlotte, Birmingham, Los Angeles, San Francisco, Montreal, Toronto.

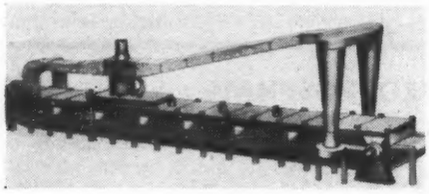
"E" FOR EXCELLENCE—The Army-Navy "E" burgee with two stars, "representing recognition by the Army and the Navy of especially meritorious production of war materials" over a two-year period flies over Monsanto.

MONSANTO CHEMICALS

SERVING INDUSTRY . . . WHICH SERVES MANKIND

DEHYDRATION

SLICES
CUBES
STRINGS



The Bowen "De-Hy" is designed to dry foods without the risk of the product becoming rancid or taking on the "hay-taste" that usually occurs a few months later after storage. The "De-Hy" uses an inert atmosphere to help insure this necessary step. If you have problems concerning the dehydration of foods write for the 12 page illustrated booklet that describes the process.

1. NO OXIDATION
2. NO CASE-HARDENING
3. TIME-TEMPERATURE AT A MINIMUM

POWDER

The Bowen Spray-Dryer is designed for reducing soups, milk, coffee, fruit juices, etc. to a uniform fast flowing powder. Bowen engineers will be glad to answer any problem you may have regarding Spray-Drying.

ILLUSTRATED DATA AVAILABLE

Bowen Research Corporation

BOWEN

MAPLE STREET GARWOOD, N. J.

Please send me a copy of "Dehydration" without charge.

Name.....

Company.....

Street.....

City.....State.....

To Concentrate Salmon Canning

Operations in Alaska will be centered in 74 of the largest and most modern plants

PRODUCTION in Alaska's 40 million dollar a year salmon canning industry is to be concentrated in 74 of the largest and most modern plants rather than the 120 previously used. This has been ordered by Secretary of the Interior Harold L. Ickes, who is also Fisheries Coordinator. This move has been made because the armed forces have taken over a large percentage of the tenders and power scows used by the industry and because it is expected that no more than 50 or 60 percent of the normal labor supply will be available.

The concentration is expected to effect a reduction in manpower of 5,030 persons, in required floating equipment of 86 tenders and 50 scows, in fishing apparatus of 48 traps, 25 purse seiners and 67,130 fathoms of gill nets. Northbound freight and passenger shipments also will be cut.

Last year the industry's 120 canneries used 226 lines of canning machinery. This year the 74 canneries will operate only 131 lines.

The Alaskan pack is expected to increase this year, but not much of it will go to civilians of the United States.

Food Freezers Have Raw Material Problem

PLANS for obtaining sufficient acreage to keep quick freezing plants operating at capacity were discussed at a meeting in Washington last month by the Frozen Fruit and Vegetable Packers Industry Advisory Committee of the Food Distribution Administration. Through the government frozen vegetable expanson program, 37 projects have been approved to provide an estimated increase in production of about 100 million pounds. It is necessary that the industry be able to contract for sufficient raw materials to keep these plants operating at full speed, the committee emphasized.

Weather Reduces Vegetable Output

INDICATION of the difficulty that will be experienced in equaling this year the bumper crops of 1942 is given by news of weather damage to early Southern crops. Adding to the damage already done by freakish winter cold spells, abnormal weather in early March caused considerably more damage. Peas and cabbage were damaged to an extent ranging between 25 and 40 percent. Estimates of damage to young tomato plants range from 35 to 75 percent. Early potatoes and strawberries also suffered considerable damage, while North Texas reports damage to spinach and onions.

Some, however, of these losses can be repaired by replanting of the acreage.

CONSTRUCTION NEWS

	Pending (thousands)	Awarded March (thousands)	Total Awarded 1943 (thousands)
Bakery	.....	.....	.....
Beverages	.....	.....	.....
Canning and Preserving	$90	$75	$75
Cold Storage Plants	316	.....	.....
Confectionery	.....	.....	.....
Grain Mill Products	2,750	75	115
Ice Manufactured	.....	.....	.....
Meats and Meat-Products	.....	.....	125
Milk Products	695	.....	80
Miscellaneous	450	180	490
	$4,301	$330	$885

Oils and Fats Supplies To Increase

RECENT estimates of the U. S. Department of Agriculture indicate that total supplies of domestic fats and oils available from 1942 production amount to 11,250,000,000 lb. This total was made up of about 4,000,000,000 lb. of vegetable oils, with the remainder of animal origin.

With production goals for 1943 for soybeans and flaxseed recently increased, it is now expected that 1943 production of vegetable oils will reach around 4,500,000,000 lb. As production of animal fats, particularly lard, should also be greater, a larger supply of fats and oils is in prospect. However, with increasing needs for these materials, particularly for Lend-Lease shipment, there will still be insufficient supplies to satisfy the demand.

Rationing Ups Interest In Dehydrated Foods

WHOLESALERS and retailers of food have found their operations considerably restricted by point rationing of canned foods and similar items. To increase the number of saleable items that they handle and in this way replace at least part of the lost volume, their attention became centered during March upon dehydrated vegetables, which so far are not rationed except in the form of soup mixes.

While at present most of the production of these dehydrated vegetables

is on government contract and little is available for civilian consumers, trade interest in the field should act to stimulate increased production by dehydrators. It is possible that, in consequence, dehydrated foods may attain a more important market position before another year has passed and become permanently established in the food field.

Prices Still Rise

NOTWITHSTANDING the attempts of government to prevent price rises, indexes of commodity prices still move upward. For example, the *N. Y. Journal of Commerce's* general commodity price index stood at 107.5 on February 13, 1943, and by March 13 had risen to 108.2. The same publication's grain price index rose in the same four weeks from 105.8 to 109.2, while the food price index rose from 112.4 to 113.5 during the period.

Among the individual spot commodity prices, most were unchanged under their ceilings, in so far as the records go. Wheat, No. 2 hard winter, Kansas City, moved up from $1.36½ to $1.37¼ between February 15 and arch 15. Corn, No. 3 yellow, Chicago, moved up from 96¼¢ to 99¢ in the same period, while flour rose from $7.05 to $7.20.

INDICATORS

Flour production in February, 1943, as reported by *The Northwestern Miller* for mills accounting for 65 percent of U. S. output, was 6,612,059 bbl., compared to 5,479,584 bbl. in February, 1942.

Spinach for canning in Texas and California this year is estimated at 41,400 tons, compared with 61,400 tons harvested in 1942 and 29,900 tons in 1941.

Pea acreage for processing expected to be planted this year is reported at 506,000 acres, compared to 480,790 acres planted last year.

Sardine pack in California, up to March 1, 1943, totaled 3,698,555 cases, all sizes, compared to 5,136,750 cases for the like period a year earlier.

Milk cows on farms on January 1, 1943, were 1 percent more numerous than a year earlier, according to the United States Department of Agriculture.

Milk production in February, 1943, is given as 8,380,000,000 lb. by the Crop Reporting Board. This compares to 8,299,000,000 lb. in February, 1942, and to a 1937-1941 average of 7,404,000,000 lb. for February.

Egg output in February, 1943, estimated at 381,400,000 dozen, is a new high record for the month and 19 percent over output in February of last year.

Eggs set in January, 1943, were 35 percent more than in January, 1942, the previous record for the month; while the revised figure for the number of hens and pullets on farms, January 1, 1943, is now given at 487,000,000 head, 14 percent larger than a year earlier.

Evaporated milk production in January, 1943, totaled 203,786,000 lb., compared to 313,517,000 lb. in January, 1942, a drop of 35 percent, but 44 percent over the 1937-1941 January average.

Condensed milk, all kinds, produced in January, 1943, totaled 57,427,000 lb., compared to 51,772,000 lb. in January, 1942.

Whole milk, dried, produced in January, 1943, was 8,050,000 lb., up 87 percent from January, 1942, output and 381 percent over the 1937-1941 average.

Skim milk, dried, produced in January, 1943, totaled 30,800,000 lb., down 23 percent below January, 1942, production and 4 percent below the 1937-1941 January average.

Cheese, American, produced in January, 1943, totaled 46,545,000 lb., down 25.3 percent below the 62,350,000 lb. produced in January, 1942, but 65 percent over the 1932-1941 January average.

Butter, creamery, produced in January, 1943, totaled 122,880,000 lb., up 2.5 percent over the 119,825,000 lb. produced in January, 1942, and 1.5 percent over the 1932-1941 January average.

Oleomargarine sales in January, 1943, as indicated by sales of internal revenue stamps, totaled 56,774,600 lb., an increase of 61 percent over sales of 35,279,840 lb. recorded in January, 1942.

Eggs, dried, produced in January, 1943, totaled 12,018,000 lb., compared to 10,774,000 lb. in January, 1942.

Eggs, liquid, produced by egg breaking plants in January, 1943, for freezing, drying and immediate consumption, totaled 42,643,000 lb., an increase of 3 percent over production in January, 1942.

Orange, lemon and grapefruit production for the 1942-1943 season is now estimated at 142,645,000 boxes, greater than in any past season except 1940-1941.

Eggs produced on farms in January, 1943, were 3,769,000,000 lb., 11 percent over the previous record of January, 1942, and 61 percent over the 1932-1941 January average.

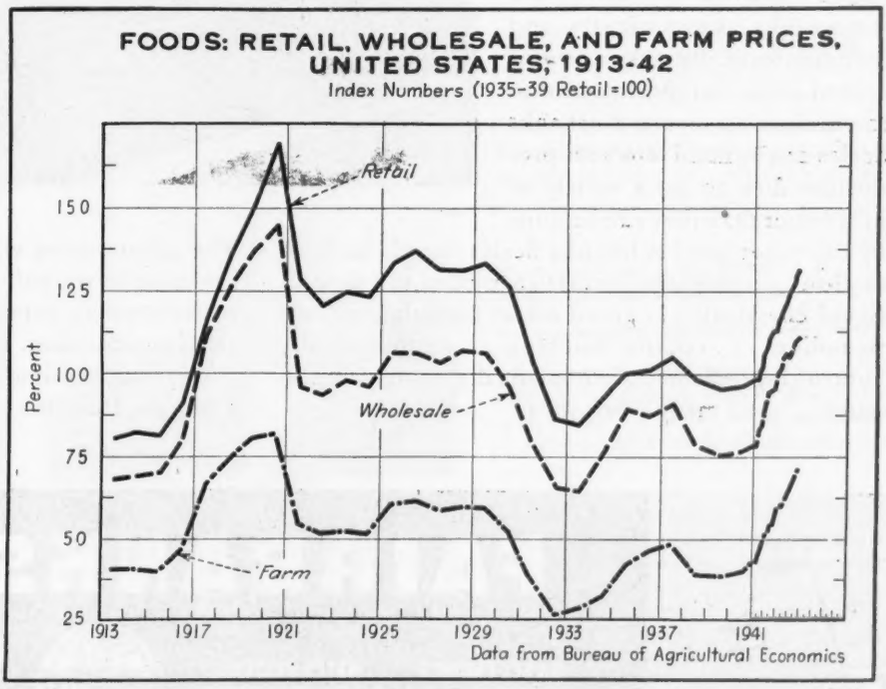
Eggs produced in the United States in 1942 totaled 48,213,000,000, 15 percent greater than the previous high record output of 1941.

Beer sales in January, 1943, totaled 4,236,302 bbl., compared to 3,970,453 bbl. in January of last year.

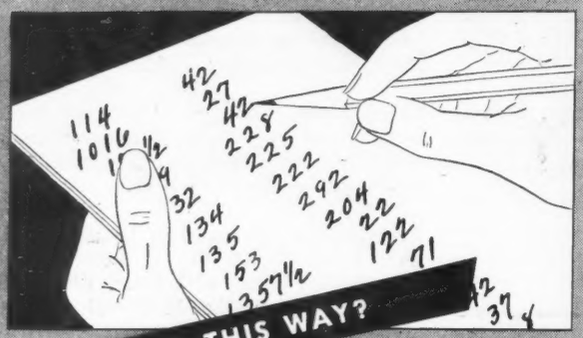
Business activity index of *Business Week* for March 13, 1943, was 200.5, compared to 196.8 a month earlier, and to 175.1 for the corresponding date of 1942.

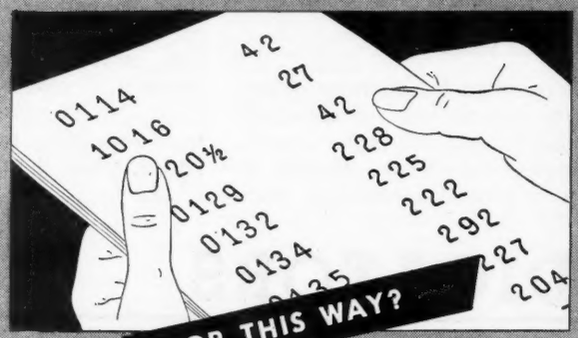
Weekly wholesale food price index of Dun and Bradstreet stood at $4.09 on March 9, 1943, the highest point since October, 1920, and comparing to $3.59 on the corresponding date of 1942.

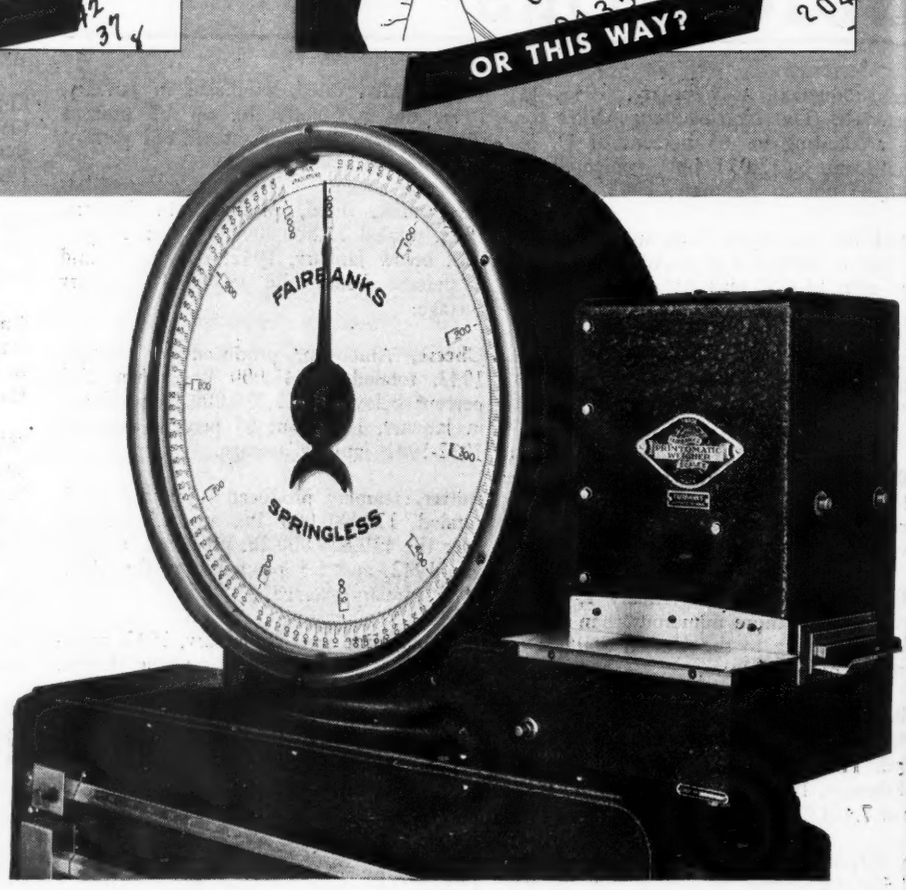
Cost of living index of National Industrial Conference Board was 101.8 in February, 1943, 7 percent over the figure for February, 1942.



How Are Weight Records Made In Your Plant—







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INDUSTRY

Albers Milling Co.'s plant in Oakland, Calif., has been destroyed by fire, with a loss estimated at $5,500,000, of which $3,000,000 was grains and cereals.

Bireley's, Inc., Hollywood, Calif., manufacturer of citrus fruit beverages, has been taken over by General Foods Corp., and becomes the Bireley Division, with Frank W. Bireley, founder, as general manager.

Borden Co., New York, N. Y., is planning an additional postwar activity—the sale of canned fish products to the public. At present, its canned fish is sold only for use in the armed forces.

Burnham & Morrill Co., Portland, Me., is conducting a wartime advertising program featuring a free recipe to teach women how to bake genuine New England baked beans at home.

Commander-Larabee Milling Co., Buffalo, N. Y., has converted a unit of its mill to the production of soybean flour. The plant will receive the soybeans in flake form and will process them into flour for use in bakery products.

Dehydrated Foods, Inc., Columbia, S. C., has been organized with capital amounting to $25,000.

Frye Packing Co.'s meat plant in Seattle, Wash., was severely damaged by fire recently when a four-motor bomber crashed, igniting the plant.

GEORGE L. MENTLEY

Formerly national sales manager of Frosted Foods Sales Corp., George L. Mentley has been appointed president of the newly formed Q-F Wholesalers, Inc., New York, N. Y., organized to distribute Birds Eye Frosted Foods to the retail trade areas in New York, Boston and Philadelphia.

DR. R. C. SHERWOOD

Dr. R. C. Sherwood, vice-president of General Mills, Inc., Minneapolis, Minn., has left for Washington, D. C. to become assistant chief of the Food Requirements Branch of Food Distribution Administration. Dr. Sherwood has had wide experience in the cereal industry.

Froedtert Grain & Malting Co.'s purchase of American Malting Co., Detroit, Mich., represents another step in its expansion program. The new plant has an approximate production capacity of 1,000,000 bu. of malt per year.

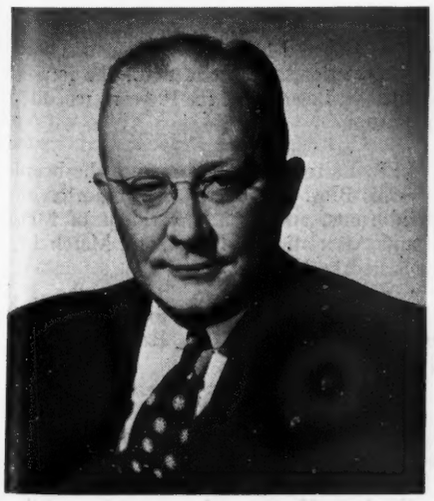
Loudon Packing Co., Terre Haute, Ind., packers of V-8 cocktail, has been purchased by Standard Brands, Inc., New York, subject to approval by the Loudon stockholders.

S. A. Moffett Co.'s $45,000 expansion program at the Grandview, Wash., plant is to provide for an increase in production of quick frozen foods.

Quaker Oats Co., Chicago, Ill., has launched a drive to promote its "Aunt Jemima" dehydrated soups in midwestern markets.

Sprague, Warner-Kenny Corp.'s Kenny division in Columbus, Ohio, has enlarged its warehouse facilities to include perishable products. In line with the governments conservation program, grocers can simplify their purchases to a single delivery.

Swift & Co.'s Alma plant in Grand Rapids, Mich., has begun construction on a $15,000 addition to dehydrate eggs and milk for use in the Army.



EARL J. HESEMAN

Igleheart Bros., Inc., Evansville, Ind., a subsidiary of General Foods Corp., has announced the appointment of Earl J. Heseman as president of the company, succeeding Edgar A. Igleheart who becomes chairman of the board.

DR. M. J. BLISH

International Minerals & Chemical Corp., Chicago, Ill., has elected Dr. M. J. Blish, well-known authority in the field of protein and cereal chemistry, chief of the research laboratory of the Amino Products Co. Division.

PERSONNEL

N. Betzold, sales manager for packaged products for Durkee Famous Foods, Cleveland, Ohio, has been elected vice-president of National Association of Margarine Manufacturers.

Dr. A. C. Dahlberg, head of the Dairy Division of New York State Experiment Station at Geneva, has been requested by the U. S. Department of Agriculture to conduct surveys of the dairy industries in Central America and northern South America to promote a better-nutrition program.

L. E. Dietrich, chief chemist for P. Duff & Sons, Pittsburgh, Pa., has been appointed director of production and research. David L. Carpenter, formerly chief chemist for Calumet Baking Powder Co., is in charge of laboratories.

Dr. Conrad Elvehjem, professor of biochemistry at the University of Wisconsin, and internationally known for his research in nutrition, has been awarded the 1943 Willard Gibbs Medal of the Chicago section of American Chemical Society for extensive studies involving the vitamin B complex. The award is one of the highest in chemical science.

M. E. Everett has been elected president of Piggly Wiggly, Macon, Inc., Macon, Ga., succeeding R. H. Kingman. J. Holland Brown becomes vice-president.

Albert Haneman, president of the Green Coffee Association of New Orleans, has been appointed coffee advisor to the Food Distribution Administration.

Richard D. Hebb, a member of the public relations department of Swift & Co., Chicago, Ill., has retired after 26 years of service.

G. Parker Merrill has been elected vice-president in charge of production for Grocery Store Products, Inc., New York, N. Y. Previous to his appointment he had been with Best Foods, Inc., and Hills Brothers Co.

Leslie F. Miller, vice-president and treasurer of Russell-Miller Milling Co., Minneapolis, Minn., has been elected president, succeeding the late Charles G. Ireys.

Dr. Helen S. Mitchell, of the Defense, Health and Welfare Administration, is on leave of absence to head the Nutrition and New Foods Section of the Office of Foreign Relief and Rehabilitation Operations.

George C. Reitinger has become head of Swift & Co.'s public relations department, succeeding Arthur D. White, who has retired. Mr. White had been with the company for 52 years.

Charles Ritz, vice-president of International Milling Co., Minneapolis, Minn., has been elected president of the company, succeeding F. A. Bean who becomes chairman of the board.

Jacob Rosenthal has been named executive director of the joint coffee committee of Pan-American Coffee Bureau and National Coffee Association. Previous to his appointment, Mr. Rosenthal had been working for the War Production Board and Food Distribution Administration.

David F. Soden has been appointed vice-president of Cream-O Specialty Sales Co., Inc., New York, N. Y.

Harry O. Weatherill, Bulman's, Ltd., Vernon, B. C., was reelected president at the annual meeting of Canned Foods Association of British Columbia.

DR. FRANKLIN C. BING

Formerly secretary of the Council on Foods and Nutrition of the American Medical Association, Dr. Franklin C. Bing has been named director of American Institute of Baking. Dr. Bing's appointment is part of the baking industry's contribution towards helping meet America's nutritional problem.

W. A. Wentworth, director of public relations of Borden Co., New York, N. Y., has been named director of industry relations.

Ernest V. Woollard has been appointed vice-president of T. M. Duche & Sons, Inc., New York, N. Y., continuing as general manager and in charge of sales of the company's Chicago branch.

DEATHS

Walter H. Belcher, 65, managing director of New England Manufacturing Confectioners Association, and president of the former Walter M. Lowrey Co. for 10 years, recently, in Boston.

L. R. Eastman, 69, chairman of the board of Hills Bros. Co., New York importers of dried fruits, and former president of Merchants Association of New York, March 14, in Scarsdale, N. Y.

George Gunther, Jr., 69, former president of Gunther Brewing Co., Baltimore, Md., Feb. 27, in Baltimore.

William Hammdorf, 59, consultant on canning and dehydration of meat products, recently, in Barto, Pa.

Edwin R. Harding, 54, senior fellow of the food varieties fellowship at Mellon Institute and well known for his research in nutrition and food technology, Feb. 17, in Pittsburgh.

James P. Harrington, 68, retired lobster commissioner of Rhode Island, Feb. 17, in Newport, R. I.

Wheelco RECORDING THERMOMETER CONTROLLER

*with "Proved-in-Service Superiority"**

Wheelco RECORDING THERM-OTROL combines an improved Recording Thermometer with the extreme efficiency of the famous Wheelco "Electronic Principle" Control System to surpass all other known control standards.

The temperature measuring-recording system and the control system are entirely independent of each other. This absence of interlocking between the two systems provides faster, more accurate control than is possible with any other control method.

Control is instantaneous and simultaneous with measuring and recording functions—all lag time and other faults inherent in mechanical type controllers are eliminated.

Therm-otrols can be supplied with either gas, vapor tension or liquid fills.

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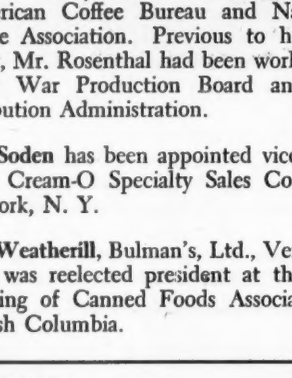

(*) The "Proved-in-Service Superiority" of Wheelco Temperature Controllers has been demonstrated in every application where temperature control is essential.

Request Bulletin G502-2 for complete information on this Controller.

Wheelco Instruments Co.

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Originator of "Electronic Principle" Temperature Controls

Charles G. Ireys, retired president of Russell-Miller Milling Co., Minneapolis, Minn., Feb. 19, in Minneapolis.

Norman H. Mayo, executive head of General Ice Cream Corp., Portland, Me., and former president of New England Association of Ice Cream Manufacturers, recently, in Portland.

Basil D. Palmer, 66, manager of Bartlett Candy Factory, St. Louis, Mo., March 2, in St. Louis.

James Edward Ramsey, 72, former head of American Bakeries Co., Birmingham, Ala., recently, in Lakeland, Fla.

T. R. Tennant, 59, general manager, United Chemical & Organic Products Division, Wilson & Co., March 1, in Chicago.

John Unkles, 76, sales executive of Steinwender, Stoffregen & Co., coffee merchants, New York, N. Y., March 2, in Newark, N. J.

ASSOCIATED INDUSTRIES

Bristol Co., Waterbury, Conn., has announced the appointment of L. G. Bean, vice-president and general sales manager, to vice-president in charge of engineering and sales.

Crown Can Co., Philadelphia, Pa., has elected W. I. Gladfelter, vice-president in charge of operations and F. Howard Braithwaite, vice-president in charge of sales.

General Motors Truck & Coach factories at Pontiac, Mich., have collected 43,533,210 lb. of vital scrap materials during the 1942 metal salvage drive—47 percent more than in any previous year.

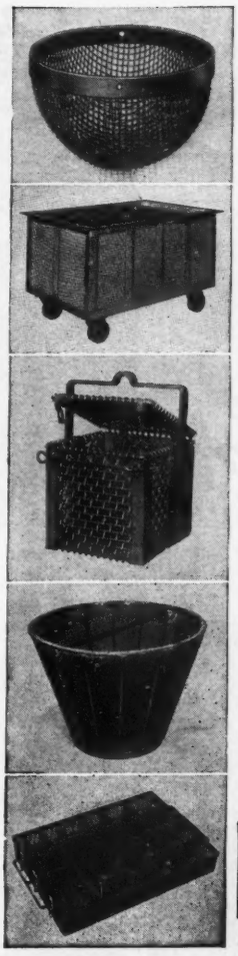
Mathieson Alkali Works, Inc., New York, N. Y., B. F. Goodrich Co.'s Koroseal division, Louisville, Ky., and Hussmann-Ligonier Co., St. Louis, Mo., have been presented the Army-Navy "E" award for excellence in production. Jenkins Bros., Bridgeport, Conn., and De Laval Steam Turbine Co., Trenton, N. J., have been awarded an additional service star for their Army-Navy "E" pennants.

Wilson & Bennett Mfg. Co., Chicago, Ill., a subsidiary of Inland Steel Co., has changed its company name to Inland Steel Container Co.

Winthrop Chemical Co., Inc., New York, N. Y., has elected William H. Berg, vice-president of the company. He also is director of special markets and of the industrial division.

Correction

Food Machinery Corp. has named James M. Hait general manager of the procurement and engineering division, instead of the Peerless Pump division as mentioned in this column in February.



Basket Troubles

"Buffalo Wire" BUILDS ALL TYPES FOR EVERY USE

Broad facilities at "Buffalo Wire" accommodate any metal basket specifications.

Your design can be fabricated in any wire, mesh or other material; in countless forms, weights and degrees of strength; and in a wide range of metals to withstand specified conditions such as high temperatures, hot acids, rust and corrosion.

FREE ON REQUEST

Basket Folder 595-BC

22 types of baskets illustrated. Information on shapes, accessories, materials. Valuable data on resisting metals for specific conditions.

DOING BUSINESS FROM COAST TO COAST FOR 74 YEARS

Buffalo WIRE WORKS CO., INC.

ESTABLISHED 1857 AS SCHEELER'S SONS

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An "Extra Hand"

Are you working short-handed? Then use this real time saver—quick-action Metso Cleaner. Metso cuts into grease without delay and suspends it. When the grease is removed, Metso whisks it away.

Users of Metso who clock cleaning operations cut minutes off each operation. And Metso's efficiency also reduces supervising time. Here's a new helper for your clean-up crew that is always dependable. Let us send you a sample to compare the results with your present method.

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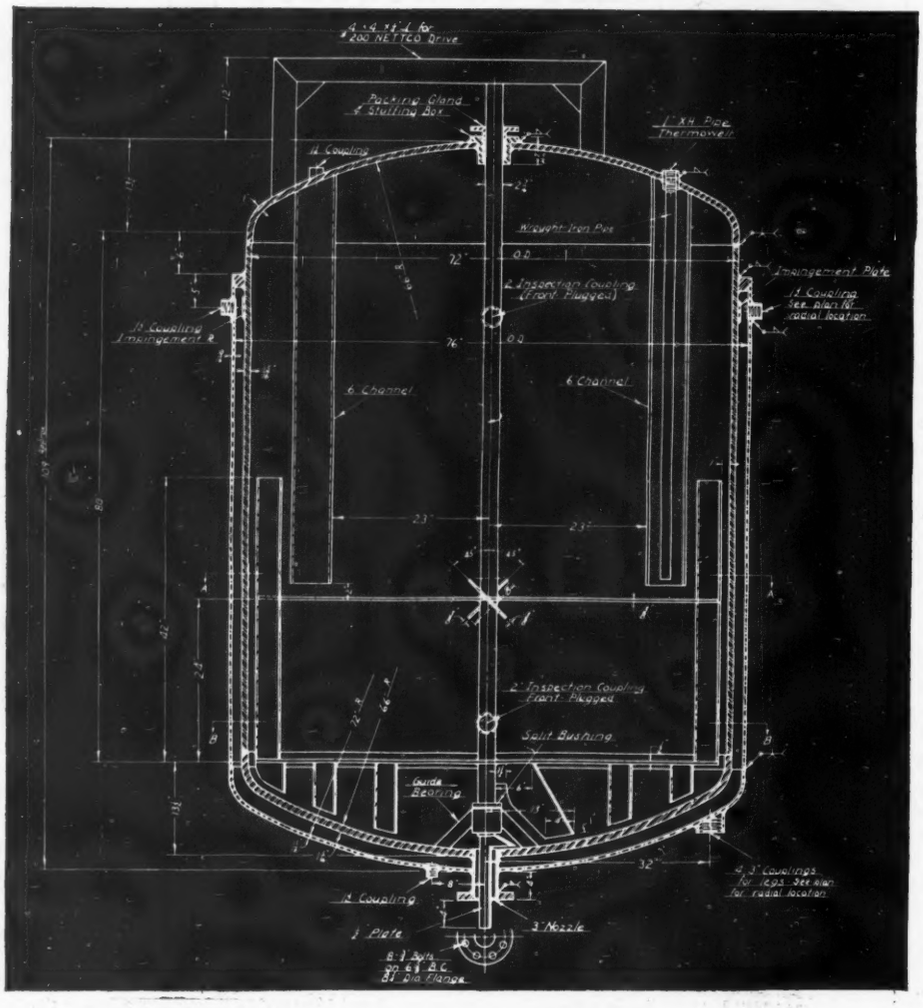
METSO CLEANERS

Sturdy, Efficient, Adaptable

PATTERSON STEAM-JACKETED MIXING KETTLE

A standard type jacketed kettle fitted with a specially designed Patterson mixer. 76" O.D. x 109" high over the shell exclusive of supports. Constructed to the A.S.M.E. code for a working pressure of 150 lbs.

—THANKS TO A *SPECIAL* TYPE OF PATTERSON MIXER



A.S.M.E. APPROVED DRAWING OF KETTLE ILLUSTRATED ABOVE

By varying the type, physical dimensions and rate of speed of the mixing mechanism, this Patterson Steam-Jacketed Mixing Kettle can be adapted to any process requiring this kind of equipment.

DEHYDRATION—In connection with the rapid development of food dehydration, we offer Patterson-Kelley Kettles, Cookers and Mixers.

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PATTERSON-KELLEY FOR DEPENDABLE, ECONOMICAL SERVICE

PATTERSON-KELLEY HEAT EXCHANGE ENGINEERS

THE *Patterson-Kelley* CO., INC.

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MANUFACTURERS FOR THE FOOD AND PROCESS INDUSTRIES

FOOD EQUIPMENT NEWS

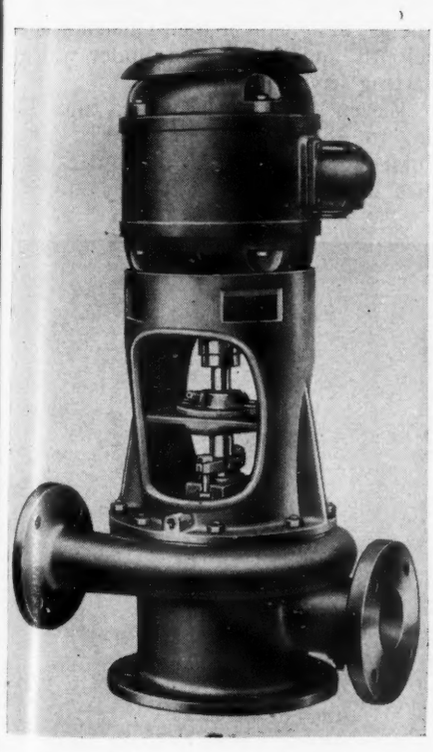
Tank Coating

PROTECTIVE COATINGS, INC., Box 56, Strathmoor Station, Detroit, Mich., has developed "Type AA Alkacite," a black liquid coating for lining tanks, vats and other vessels where abrasion is not present. The coating offers high resistance against acids or alkalis, but is not recommended for contact with oils, greases or solvents. It has a high gloss and is said to be highly flexible and not to peel. It is applied with brush or spray.

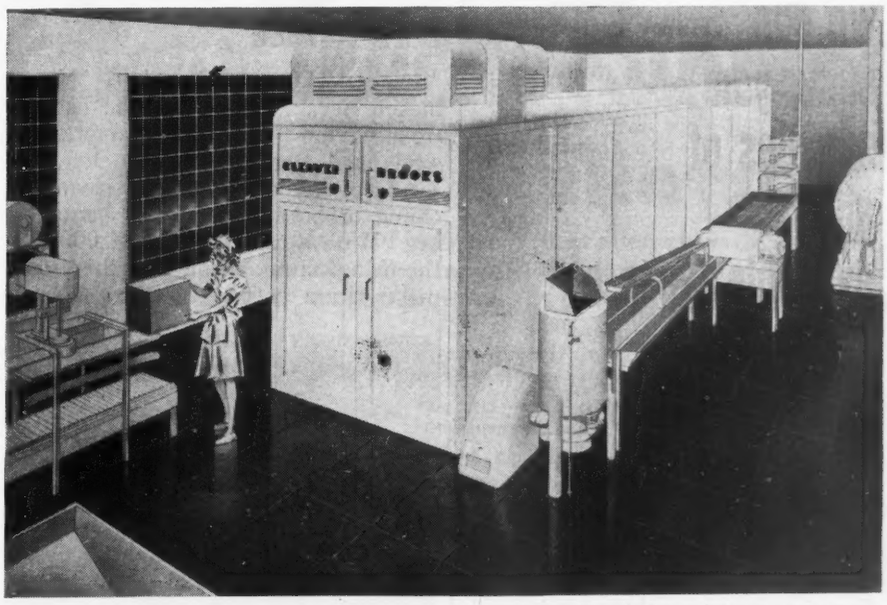
Vertical Pumps

ECONOMY PUMPS, INC., Hamilton Ohio, has brought out a line of vertical pumps, the Type SCV, for service on clear liquids. These pumps have capacities from 10 to 400 gal. per minute at heads from 10 to 60 ft. They are adapted to cold- and hot-water pumping, brine circulation, air conditioning and food plant operations, among other uses. They are single-suction, volute type, with motor detachably mounted at top, and come in 1- to 2-in. sizes with standard threaded pipe tap connections and in sizes of 2½ in. and larger with standard 125-lb. flanged connections.

Advantages claimed for these vertical pumps include that the motors are mounted above—thus less exposed to dirt or water—and that the motors can be removed without disturbing the pipe connections. Also, less floor space is required, cleaning is easier, lubrication is simpler, there is only one stuffing box, and operation is quieter.



Vertical pump for clear liquids.



Sketch of Cleaver-Brooks complete dehydration plant for vegetables.

Air Dryer

TAMMS SILICA CO., 228 No. LaSalle St., Chicago, has designed treated wood tripods for holding 10 lb. bags of "Dri-Air" in factory or warehouse. In this way, this product is available for removing atmospheric moisture and condensations in these areas, without the use of scarce metals.

Dehydration Plant

A COMPLETE dehydration plant for the dehydration of vegetables has been designed by Cleaver-Brooks Co., 5100 North 33rd St., Milwaukee, Wis. Designated Model VD-10, the plant has a nominal capacity of ten tons of raw prepared material every 24 hours. It consists of the following individual elements: (1) boiler; (2) dehydrater; (3) peeler; (4) trim table; (5) slicer and stripper; (6) washer; (7) traying and inspection table; (8) blancher; (9) unloading hopper; (10) packaging shaker; (11) packaging and sealing machine; (12) box banding unit. Additional optional equipment includes a ricing machine and an equalizing bin or dessicator for finishing drying.

This dehydrating unit requires approximately 2,000 sq.ft. of floor space, with additional space required for storage.

A dual tunnel, dual control dehydrater is used, having 4,800 sq.ft. of tray area. It is provided with 12,000 cu.ft. per minute air flow and can be operated parallel flow, counter flow, or center exhaust. Construction is of waterproof asbestocite interior and exterior, with mineral wool insulation, steel tracks, steel trucks and expanded steel galvanized trays. The boiler that supplies heat to this dehydrater and steam to the blancher is a Model OB-3 automatic oil fired unit of 30 boiler horsepower, complete with automatic condensate return system and controls.

Taking the other elements of the plant in order of their occurrence, the primary washer is of the continuous flow, tub type, made of galvanized steel. The peeler is of the caustic bath type, with steam coils and thermostat, followed by a motor driven rotary washer. Next is a trim table of stationary type built of galvanized steel, designed for eight operators. This is followed by a slicer and stripper of motor driven, centrifugal type. The traying and inspection table is of millwork and waterproof plywood, enameled. Blanching is done in a dual chamber blancher of retort pressure type with quick opening doors, adjustable automatic controls and air eliminator. The unloading hopper is of enameled waterproof plywood. When a second stage or equalizing bin is used, it consists of bins, blower and dehumidifying unit. Packaging shaker and packaging and sealing machines are customary units for the purpose.

In addition to supplying this complete dehydrating plant, Cleaver-Brooks Co. provides the services of an instal-

• For 30 seconds of your time and a 3-cent stamp, we can save you weeks of comparative "shopping" for food packages . . .

If you will mail the coupon

we can show you samples of all available types of paper packagings which are suitable for your product

Because we can supply not just one or a few of the available types of paper packages, but *every type*, we can give you the complete paper packagings picture, and can make recommendations that are absolutely without bias.

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Packaging Division
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DESCRIPTION OF PRODUCTS:..... .....

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SIZE OF PACKAGE OR QUANTITY PACKED:.....

—AND, IF YOU WANT PRICE QUOTATIONS, GIVE

THE APPROXIMATE QUANTITY:.....

NAME .....

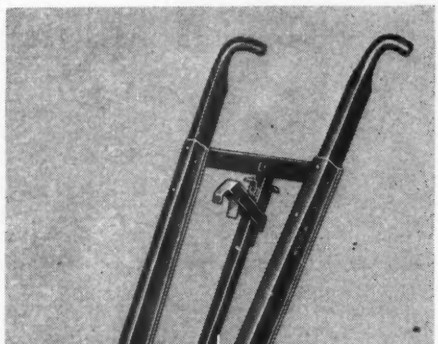
TITLE .....

—Just sign and clip coupon to letterhead—

lation engineer, to supervise the erection and initial operation of the plant. The company also maintains a school for the instruction of dehydration plant operators.

Barrel Truck

AMERICAN PULLEY Co., 4200 Wissahickon Ave., Philadelphia, Pa., has introduced the "Upsy" truck, a pressed-steel hand truck particularly designed for handling any container having a chime or bead, as a drum, barrel or keg. With a capacity up to 1,000 lb., the manufacturer claims that this truck makes drum or barrel moving a one-man job, and loads the container without the need of first moving it away from other adjacent containers.



Truck for barrels or drums.

In use, a sliding hook on the center rail of the truck catches the bead or chime of the drum or barrel. The trucker then pulls down on the handles, tilting the drum toward him. This allows the nose prongs to slide under the bottom bead. Then, as the truck handles are lowered to trucking position, the nose lifts the drum or barrel off the floor and the load is ready to be moved. As the adjustable hook has a range from 16 to 40 in., even a small keg can be accommodated.

Fly-Ash Arrestor

FOR eliminating the nuisance of fly ash from stack gases, the Fly Ash Arrestor Corp., Box 1883, Birmingham, Ala., is producing the "Whirlex" fly-ash arrestor. This consists of a multiple-flight helicoid device to be placed in the stack. In operation, this gives the stack gases a change in direction, causing the cinders and ash to be deflected, forced to travel around the inner jacket and pass through collector slots into the annular space between the stack and the jacket. Here they are caught in a downward draft and swept into gravity conveyor pipes leading to a closed hopper or to an over-fire re-injection system.

This device has been designed for minimum draft losses. It can be installed in any stack.

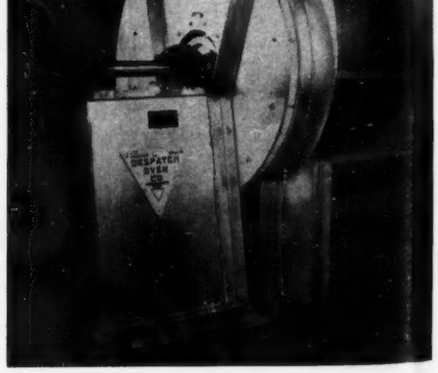
Fire-Fighting Foam

"ALCOFOAM" is the name of a foam fire extinguisher recently brought out by American-LaFrance-Foamite Corp., Elmira, N. Y., for fighting fires involving alcohols, ketones, esters, ethers and similar inflammables. The foam is produced from a powder which is poured into a generator fitting on a hose line and is carried on the water stream. So handled, it generates a foam capable of floating on the lightest liquid surface, cutting off the oxygen supply and extinguishing the fire. This foam, which forms an air-tight, heat-resisting, tenacious blanket, is made up of minute bubbles containing CO_2 gas.

High Temperature Fans

HIGH TEMPERATURE acid-resistant fans of alloy steel, used on "Despatch" industrial furnaces and ovens for the past seven years, are now being offered for general purposes by Despatch Oven Co., 600 9th St., S.E., Minneapolis, Minn. These fans are suited to heavy duty, high volume service at temperatures up to 1,600 deg. F. They are of special construction, embodying precision-balancing, designed for high efficiency and smooth, quiet operation under widely varying service conditions.

Eleven sizes are available, from 12 in. to 48 in. diameter wheels, with total pressure up to 10 in., and capacities up to 20,000 cu.ft. per minute.

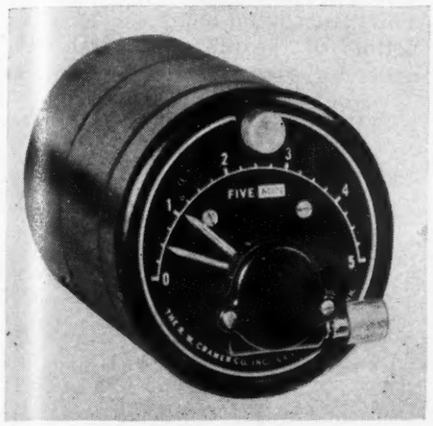


High temperature acid resistant fan.

Drive is by multiple V-belt. Fan wheel, shaft and other parts can be removed without disturbing the housing. Construction can be of various alloy steels, to suit requirements.

Reset Timers

FOR THE ACCURATE TIMING of electrical circuits, in the food, processing and other industries, R. W. Cramer Co., Inc., Centerbrook, Conn., has brought out Types RS4 and RS5 syn-



Reset timer for controlling electrical circuits.

chronous motor driven timers of the reset type. These are available for time ranges up to 5 hours, or longer if desired.

These timers repeat their time cycle upon manual operation of a built-in start button and they indicate, at all times, the expired and unexpired part of the cycle, as well as the setting time. The Type RS4 timer has a double throw switch and opens or closes the circuit, depending upon the choice of circuit, and starts by pressing and then releasing the start button, which also resets the timer. The Type RS5 timer differs, in that it is mechanically held in a neutral position when the button is depressed, and it starts the timing cycle by pulling the start button outward.

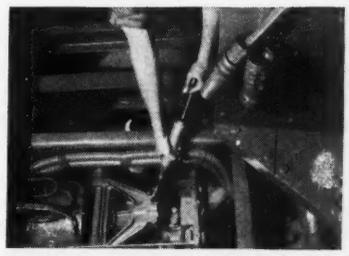
Both timers have a capacity of 10 amperes at 115 volts, or 5 amperes at 220 volts, non-inductive load, and will control a ½ hp. motor, a heater load up to 1,200 watts, a lamp load up to 250 watts, or a relay load not exceeding 15 amperes inrush at 115 volts alternating current. The timers can be supplied in various mountings, and with built-in audible or visible signals.

Floor Patch

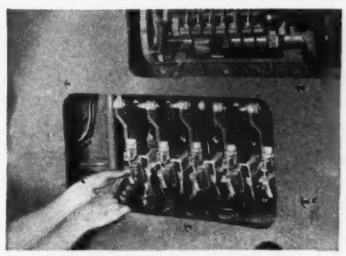
FLEXROCK CO., 23rd and Manning Sts., Philadelphia, Pa., has brought out "Instant-Use" floor resurfacer, a floor patching material that permits floors to be used immediately the patch is tamped in place. In using this material, the hole or rut is first cleaned out to remove all loose particles or dirt. The hole is

How to keep Your Trucks Running FOR THE DURATION

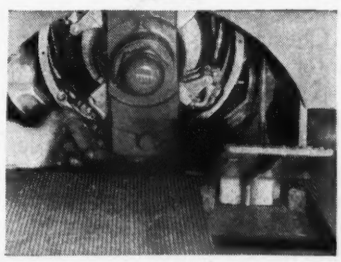
● Proper maintenance of industrial trucks always pays dividends, but today it becomes a deciding factor in the success of our war production effort. Most truck failures can be avoided by routine care and maintenance.



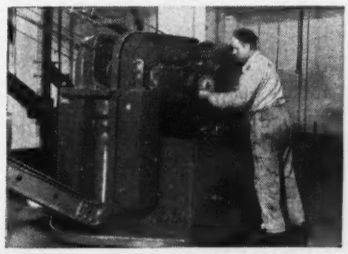
Correct lubrication according to manufacturer's instructions is an essential phase of truck care.



Control equipment should be inspected monthly. Here mechanic is replacing a finger tip.



Dust covers should be removed monthly to inspect commutators and brushes... Brushes should have at least 60% bearing surface.



Removing the rotor disc from the magnetic disc brake for monthly inspection.

First—Provide good floor conditions and DO NOT overload.

Second—Place trucks under the supervision of a competent mechanic.

Third—Lubricate regularly as instructed by manufacturer.

Fourth—Keep a record sheet covering weekly inspection findings, lubrications, adjustments, repairs. Thus excessive wear can be spotted and serious damage overcome.

ROUTINE SCHEDULE FOR TRUCK MAINTENANCE

Every Week. *BRAKES*—Test service brakes for stopping with maximum load, and parking brakes for holding on steepest incline. Adjust as required. Inspect linings—if dirty or greasy, wash in gasoline, if worn, replace.

STEERING CONNECTIONS—Test for:

a) Lost motion at ball joints and rod yokes due to wear.
b) Tight joints at rod yokes due to bent levers or rods.
c) Misalignment of steering wheels.
d) Worn bearings in steering post or bell crank.

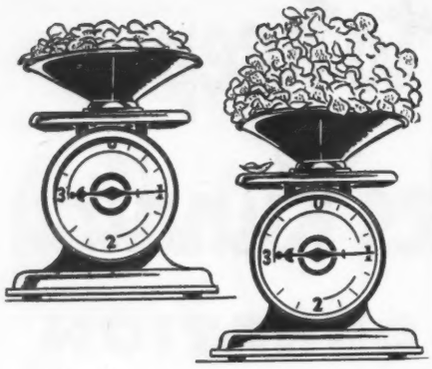
Make adjustments according to instructions, and replacements as required. WHEEL ALIGNMENT—Follow manufacturer's instructions for checking and lining up wheels on each type of truck. LIFT OR HOIST—Clean grease and dirt from rails, inspect chains, anchor bolts, hydraulic system, and limit switch. Use neatsfoot oil to keep leathers soft. LUBRICATION—Follow manufacturer's instructions for points requiring weekly lubrication. ELECTRICAL EQUIPMENT—If working in dusty environment, remove covers from motors and electric controls, and blow out dust.

Every Month—Monthly inspection covers the most important mechanical parts of truck: power axle, wheel bearings and universal joints, spindle bearings, drive and torque yokes, Oldham coupling, trailing axle and wheels, brake drum, motors, brushes, controller, contactor, limit switches, hydraulic lift. Repairs on these parts are costly. Do not slight any part that requires lubrication. Keep moving parts free from dirt and grease. Follow detailed instructions from manufacturer.

Maintenance check list is available in bulletin form. Write for your copy or copies today.

BAKER INDUSTRIAL TRUCK DIVISION
of The Baker-Raulang Company
2146 WEST 25th STREET • CLEVELAND, OHIO
In Canada: Railway and Power Engineering Corp., Ltd.
2900-2A-43

Baker INDUSTRIAL TRUCKS



How many chips in a pound?

There's a vast difference in volume, not to mention TASTE, between a pound of soggy, rancid and partly burnt potato chips — AND — the crisp, clean, dry, tender and correctly-salted product turned out by the

FERRY

CONTINUOUS POTATO-CHIP MACHINE

Automatic control of peeling, washing, slicing, conditioning, drying, frying, salting, cooling, and delivery to containers—easily regulated and mechanically maintained by the FERRY Machine—is responsible for the superior QUALITY of FERRY Potato Chips.

This larger volume—of a superior product—together with the less costly mechanical operation—result in *economy* to owners of FERRY Continuous Potato-Chip Machines. Built in 5 sizes, delivering from 50 to 350 lbs. of finished chips per hour.

Write to-day for the full facts in Bulletin FI.

Also makers of

SLICERS & AUTOMATIC SLICER FEEDERS

CAN WASHING MACHINERY

J. D. FERRY CO.

129 SO. CAMERON ST.

HARRISBURG, PA.

then primed with "Instant-Use" primer, painting well beyond the edges. Then "Instant-Use" is shoveled into the hole just as it comes from the drum and tamped lightly at first, increasing the force until the entire patch is smoothed out. To obtain the best possible seal, a second coat of primer is applied to the edges of the patch. The patch is then ready to take heavy traffic.

This resurfacer can be applied to factory floors of concrete, brick or asphalt.

Steam-Jacketed Pump

Blackmer Pump Co., Grand Rapids, Mich., has brought out a simplified steam-jacketed pump for use in handling products that must be kept hot while being transferred. This pump is equipped with steam jacketed heads made of cast semi-steel with threaded intake and exhaust steam ports.

The pumps are designed for steam pressures up to 125 lb. The grease lubricated bearings supplied with these pumps are located outside the pump case and away from the pumping. Construction of these bearings is heavy to avoid shaft whip and distortion. The stuffing box glands are of the bolted type with back-off nuts to make repacking easy.

These pumps are available in capacities of from 20 to 700 gal. per minute and pressures up to 300 lb. per sq.in. They are furnished with either single or double reduction gear drives and single or multiple pump units.

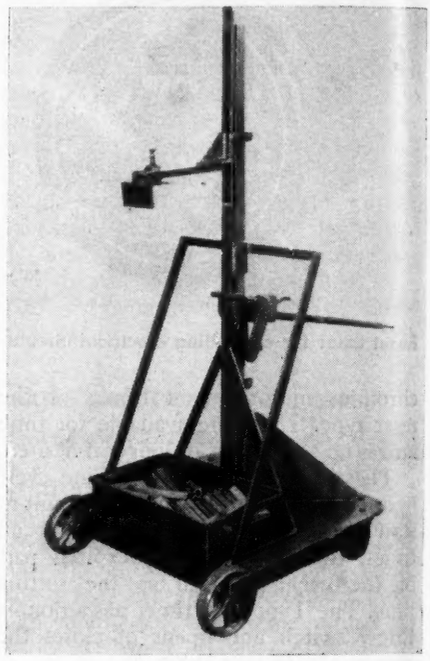
Portable Car Spotter

Link-Belt Co., 307 North Michigan Ave., Chicago, has brought out a line of motor driven portable car spotters. The spotter is so balanced on a channel iron frame that one man can lift one end and roll the unit to any desired location. The frame is then anchored by means of a chain, as shown in the photograph, the electric cord plugged into the nearest power outlet, the haulage cable hooked to the car or object that is to be moved, and the other end of cable wrapped around the capstan.

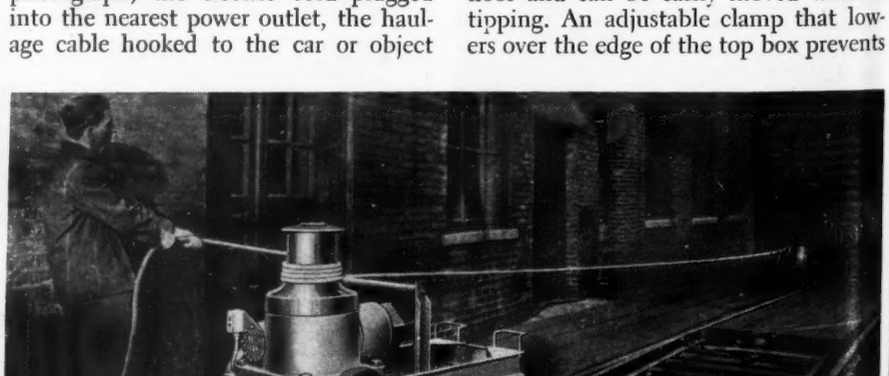
This device can be used for spotting railroad cars on any number of tracks, hauling trucks and doing other moving jobs at any place inside or outside the plant.

Stacking Box Carrier

Ernst Carrier Sales Co., 1456 Jefferson Ave., Buffalo, N. Y., has developed the "Stacking Box Carrier," designed to handle a column of self-nesting boxes. This carrier has a built-in wedge at the bottom of the lift post, which slides under the stack, thereby obviating the use of a skid. After sliding the wedge under the stack, the handle is depressed, raising the stack from the floor. When the handle reaches the horizontal, it automatically locks in position. The load is then three inches above the floor and can be easily moved without tipping. An adjustable clamp that lowers over the edge of the top box prevents



Stacking box carrier.

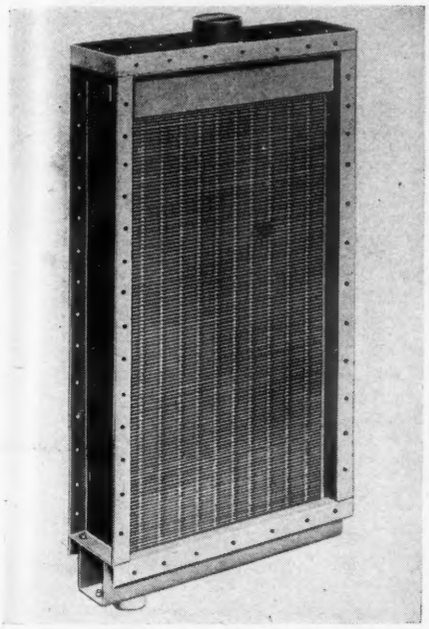


Portable electric car spotter.

forward tipping or swaying of the stack. Side sway is prevented by bars mounted diagonally from the post to the base. Rated capacity is 1,500 pounds.

Heating Coils

A LINE of steel heating coils for use in food dehydration and other processing operations has been designed by Modine



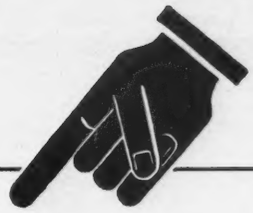
All steel heating coil for food dehydration.

Mfg. Co., Racine, Wis. The line includes standard coils, and steam distribution type coils for use where inlet air at below freezing temperatures is introduced.

Steel has been used throughout the construction of these coils in order to save copper. To protect the steel fins from corrosion, the entire coil is dipped in a lead-alloy bath. Tubes have heavy walls to give resistance to internal steam corrosion.

Fins are bonded permanently with metal, sealing contact of fin to tube against corrosion. The fins are die-formed to give effective turbulence to the air with a minimum of air resistance. Casings are designed for duct installation in end vertical, side vertical or horizontal position, and are constructed of heavy, rust-proofed steel channels and painted.

These steel coils are guaranteed to withstand hydrostatic pressure up to 500 lb. per square inch or operating steam pressure up to 150 lb. per square inch. Three casing widths are available —21¼ in., 29 in. and 37¾ in., with 13 casing lengths ranging from 2 ft. 8½ in. to 10 ft. 8½ in. (steam distribution type only up to 6 ft. 8½ in.). Several selections of fin spacing and number of rows of tubes deep are also available.



LOW-COST, FAST CUTTING

. . . for Regular Processing

. . . for Dehydrating

- **Adaptability to fast production lines**
- **Dependability for nearly every type of food**
- **Razor sharp cutting action that retains juices**
- **Fully automatic operation—saves manpower**
- **These are some of the features of the new "Enterprise" Master Series Chopping Machines**

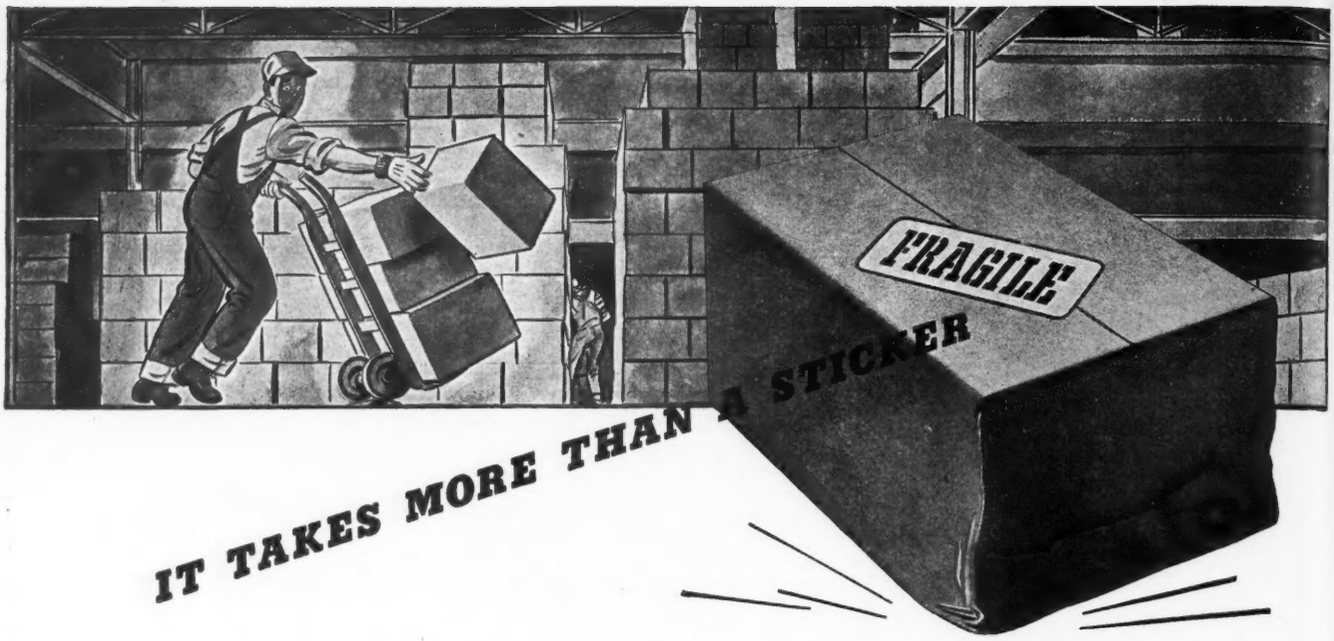
Today, many different types of food are being successfully reduced by "Enterprise" Choppers—nuts, carrots, spinach, meats, etc.; also foods with high sugar content like dried figs, apricots, prunes.

There is a full line of production machines ranging from the largest "Enterprise" Master Series Chopper (Model 4566SC) which handles up to 13,000 lbs. per hour to the smallest (Model 1541) which handles 1200 lbs. per hour. They fit practically any production set-up in that they can be fed by conveyor or from table or truck. On any model, depending upon your requirements, the food can be cut through openings ranging from 5/64ths of an inch to 1½ inches.

If you will let us know your specific problem—type of food, size of cut required, capacity expected—we shall gladly send you full specifications of models suggested for your use. Address Dept. 400.

ENTERPRISE MFG. CO. of PA.

3rd & DAUPHIN STS. PHILA., U. S. A.



IT TAKES MORE THAN A STICKER

TO FIGHT A TON-MILE GIANT

IT TAKES strong, sturdy corrugated boxes to stand up under the pressure and pounding of doubled ton-mileage traffic. Boxes that take their part . . . and yours . . . when they're jostled and shoved and stepped on by Mr. R. R. Ton-mileage. Sure, this giant is rough and tough; he has his sleeves rolled up to win the war. But now, more than ever, he respects rugged corrugated packaging.

You will too. You'll respect it because it prevents unnecessary waste of man-power, machines, materials and time. You'll respect it because it's a practical cost-cutter. And, you'll be surprised to learn how economically corrugated boxes can be engineered to cushion the multiplied jolts of war-time shipping.

For an accurate cost estimate, get in touch with the H & D Package Laboratory. You'll welcome the overall savings it can show you.

Protect the Product

BETTER SEE H&D AUTHORITY ON PACKAGING

THERE'S A WORLD OF INFORMATION IN THESE FREE "TEXT-BOOKLETS"

Quick answers to shipping questions that pop up frequently; simple solutions to problems of distribution under any conditions—that's what you'll find in this "refresher course" in packaging. For free copies, write...

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JUST OFF THE PRESS

BOOKLETS • LITERATURE • BULLETINS

FOOD PLANT EQUIPMENT

Hoisting Equipment—A 4-page folder describing methods of maintenance for hoists and cranes has been published by Robbins & Meyers, Inc., Hoist & Crane Division, Department M2, Springfield, Mass.

Hoisting Equipment—A 14-page catalog, "Modern Materials Handling Magic," which provides helpful ideas for use in solving materials handling problems, has been issued by Reading Chain & Block Corp., 2100 Adams St., Reading, Pa.

Humidifiers—"Armstrong Humidifiers in Industry" is the title of a 7-page bulletin illustrating the various types of industries using humidifiers, such as printing plants, textile mills, cotton spinning rooms and shoe leather storage; published by Armstrong Machine Works, Three Rivers, Mich.

Processing Equipment—Volume 3 of "Clad News" describing and illustrating "clad" steel for such processing equipment as evaporators. mixers, tanks and kettles has been published by Lukens Steel Co., 167 Lukens Bldg., Coatesville, Pa.

Processing Equipment—A 20-page booklet "Heat Transfer Through Metallic Walls" giving formulas for determining overall heat transfer rates, thermal conductivities of metals and alloys commonly used in construction of process equipment, together with illustrations, has been published by International Nickel Co., 67 Wall St., New York, N. Y.

Spray Equipment—Spraying and its application to such industries as baking and other industries are photographically illustrated in the 32-page pamphlet "Eclipse Spray Equipment on the Job," issued by Eclipse Air Brush Co., Inc., 390 Park Ave., Newark, N. J.

Spray-Drying—A brief factual folder "The Bowen Process for Spray-Drying Foods" describes dehydration by the spray-drying method for such foods as milk and eggs; issued by Bowen Research Corp., Garwood, N. J.

PLANT SUPPLIES

Belt Drives—"Handbook of Modern Mechanical Power Transmission for Industry," a 32-page pamphlet, explains correct grouping of machines, proper care of belts for long-term service, and gives information on conserving electric motors and accessory equipment; issued by Cling-Surface Co., Buffalo, N. Y.

Brushes—"Industrial Brushes" is the title of 47-page Catalog No. 10, containing photographs, specifications and uses of various types of brushes; published by Atlanta Brush Co., 30 Hilliard St., Atlanta, Ga.

Compressors and Vacuum Pumps—"Ro-Flo" rotary compressors and pumps are described with installation diagrams, tables of capacities and curves showing the relationship between pressure, temperature and volume, in the 18-page Catalog B-6211 published by Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Condensation—How to prevent and cure the formation of damaging condensation on metal pipes and fixtures and concrete basement walls and ceilings is told in the 32-page "No Drip Handbook," published by J. W. Mortell Co., Kankakee, Ill.

Machine Maintenance—"How to Keep Your Wrapping Machines on the Job for the Duration" describes proper lubrication and cleaning methods, adjustments and periodic check-ups to help maintain wrapping equipment at peak efficiency; published by Package Machinery Co., 152 W. 42nd St., New York, N. Y.

Metal Belts—Eight types of woven wire belts for food plant operations are concisely described and photographed according to load capacity in the folder "Audubon Metalwove Belts," Bulletin A, published by Audubon Wire Cloth Corp., Richmond St. & Castor Ave., Philadelphia, Pa.

Rotary Pumps—A simplified check chart prepared in card form for servicing rotary pumps, Form No. SER-1, has been issued by Blackmer Pump Co., Grand Rapids, Mich.

CONTROL EQUIPMENT

Control Equipment—A portable Aminco dry-ice cabinet that provides temperatures ranging from —90 deg. to 220 deg. F. and maintains a constant temperature within ±½ deg F. is described in Bulletin B211 by American Instrument Co., 8010 Georgia Ave., Silver Spring, Md.

Control Equipment—"Photoelectric Relays for Automatic Control," GEA-1755-E, a brief factual booklet illustrating various types of general-purpose relays, has been issued by General Electric Co., Schenectady, N. Y.

Control Instruments—A 16-page bulletin BZ6100 giving a condensed listing of measuring and control instruments, such as remote controllers and combustion safeguard equipment, is issued by Wheelco Instruments Co., 846 W. Harrison St., Chicago, Ill.

Precision Instruments—Such instruments as the Waco pyrometer for measuring cold-end temperatures, the Universal Coleman spectrophotometer for precise analytical procedures and the Bendix Electro-Stripper for determination of tin coating are described and illustrated in the 28-page booklet, "Waco Catalyst," Volume VI, 1942, of Wilkens-Anderson Co., 111 W. Canal St., Chicago, Ill.

LABORATORY EQUIPMENT

Laboratory Supplies—Three brief folders containing information on "Standard Solutions," "Laboratory Aersol 10%" and "Fisher Tissuemat," an embedding material, are published by Eimer and Amend, 633-635 Greenwich St., New York, N. Y.

Laboratory Ventilation—The use of "Filteraire" in the ventilation of sterile culture rooms and for other laboratory purposes, is described in a recent 4-page booklet issued by Davies Air Filter Corporation, 118 E. 25th St., New York.

MISCELLANEOUS

Sanitation—"Digest of Successful Methods for Increasing Efficiency of War-Time Sanitation Procedures in Meat Packing and Sausage Plants," is a 17-page booklet concisely reviewing materials, methods and procedures for safely, effectively and quickly cleaning over 59 different types of meat processing and handling equipment, published by Oakite Products, Inc., 22 Thames St., New York, N. Y.

Spectrophotometer—An 8-page bulletin, "Coleman Universal Spectrophotometer," giving technical data and illustrating by charts the spectrophotometer's adaptability in vitamin assays, colorimetric measurements of concentration and identification of color by transmission readings over the entire visible spectrum, has been published by Wilkens-Anderson Co., 111 North Canal St., Chicago, Ill.

V-Belt Drives—A comprehensive catalog and instruction manual, "Veelos V-Belt," gives complete engineering data for determining the necessary size of a drive, lists production advantages, contains V-belt length tables and illustrates installations; issued by Manheim Mfg. & Belting Co., Manheim, Pa.

"Whad'ya Know, Brother, About BULK?"

EVERY TECHNICAL man is supposed to know his own field thoroughly and have a general idea of related technical fields. But few food processors have time to develop more than a sketchy knowledge of these related subjects.

Take the bulkiness of salt—the specific gravity—which may vary rather widely. A survey of various salt products from different sections of the country has shown that even salt of the same grade can vary up to 25% in bulkiness over a period of months.

Diamond Crystal processing engineers have eliminated this variation to a considerable extent through rigid control of crystallizing conditions and the most modern screening methods. Thus the various grades of Diamond Crystal Salt will not vary more than 4% plus or minus—usually not over 2%.

If you, as a food processor, are applying salt by volume—through a hopper, for example, as in salting soda crackers, potato chips, and similar products—you can only achieve flavor control by using a salt that varies but slightly in bulkiness. Why not check the density of each shipment of salt you are using and see how much it varies in bulk?

NEED HELP? HERE IT IS!

If this is the solution to that variable-flavor problem, write our Director of Technical Service. He will be glad to help you find a cure. Diamond Crystal, Dept. J-4, St. Clair, Michigan.

DIAMOND CRYSTAL
ALBERGER PROCESS **SALT**

PATENTS

Fats and Oils Protected Against Rancidity Development During Storage by Wrapping in Paper Containing Phenolic Inhibitor—Harold S. Mitchell, to Industrial Patents Corp., Chicago, Ill. No. 2,309,079. Jan. 19, 1943.

Green Coffee Freed From Caffein Content by Continuous Countercurrent Extraction—Norton E. Berry, Summit, and Roy H. Walters, Rutherford, N. J., to General Foods Corp., New York, N. Y. No. 2,309,092. Jan. 26, 1943.

Juice Extracted From Citrus Fruit by Controlled Pressure Applied to Avoid Substantial Rupture of Skin—Ralph Polk, Sr., Tampa, and Ralph Polk, Jr., Haines City, Fla., to Polk Development Co., Tampa, Fla. No. 2,309,328. Jan. 26, 1943.

Gelatine Extract Made From Gelatinous Stock Treated With Caustic Soda Solution Containing Zinc Oxide—Edward F. Christopher, to Industrial Patents Corp., Chicago, Ill. No. 2,309,340. Jan. 26, 1943.

Sausages Stuffed Into Containers Under Controlled Pressures—Herbert L. Hunn and Anthony P. Vastola, to John E. Smith's Sons Co., Buffalo, N. Y. No. 2,309,345. Jan. 26, 1943.

Phosphatide Constituent of Solid Fatty Food Product Extracted Prior to Roasting to Avoid Objectionable Heat Destruction of Phosphatide—Harry Bresnick, New York, N. Y. No. 2,309,884. Feb. 2, 1943.

Operations in Continuous Dryer Held Under Thermostatic Zone Control According to Moisture Content of Material Being Dried—Rutcher Skagerberg, Penn Wynne, Pa., to Brown Instrument Co., Philadelphia, Pa. No. 2,309,993. Feb. 2, 1943.

Cereal Prepared, Canned and Processed to Retain Natural Color, Aroma and Flavor—Elmer G. Gustavson, to Quaker Oats Co., Chicago, Ill. No. 2,310,028. Feb. 2, 1943.

Disintegrated Meat Mechanically Reformed and Shaped During Passage Between Rolls—Charles Doering, Henry H. Doering, Bert J. Skoglund and Eric W. Anderson, Chicago, Ill., to Charles Doering and Henry H. Doering. No. 2,310,067. Feb. 2, 1943.

Corn Oil Separated From Corn Gluten by Adjustment of Slurry pH to Approximately 8 to 11, Permitting Almost Complete Liberation of Oil Content—Herman H. Schopmeyer, Hammond, Ind., and Gordon V. Sharps, Chicago, Ill., to American Maize-Products Co. No. 2,310,184. Feb. 2, 1943.

Oleic Acid Esters Converted to Elaidic Acid Esters by Isomerization to Raise Melting Point of Natural Fats—William R. Eipper, Wilkes-Barre, Pa. No. 2,310,225. Feb. 9, 1943.

Waste, Sugar-refining Charcoal, Water Extract Fermented With Leuconostoc mesenteroides As Improved Method of Producing Dextran—Grant L. Stahly, Columbus, Ohio, to Commonwealth Engineering Co. of Ohio, Dayton, Ohio. No. 2,310,263. Feb. 9, 1943.

Ball-shaped Doughnut Made by Mechanical Means—Louis E. Russell, Catonsville, Md., to Doughnut Corp. of America, New York, N. Y. No. 2,310,463. Feb. 9, 1943.

Meat Trolleys Mechanically Cleaned and Protectively Coated in Continuous Manner—Paul J. Lawson, Columbus, Ohio. No. 2,310,585. Feb. 9, 1943.

Liquid Food Material Concentrated Before Dehydrating by Passing at High Velocities Through Heated Evaporating Tubes—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,310,649. Feb. 9, 1943.

Liquid Food Material Converted to Powdered State by Spray-drying Procedure Making Use of Heat Content of Removed Vapor to Raise Temperature of Incoming Liquid—David D. Peebles, Berkeley, Calif., to Golden State Co., Ltd., San Francisco, Calif. No. 2,310,650. Feb. 9, 1943.

Corn Germs Removed From Cracked Grain by Centrifugal Action—Albert Peltzer and Albert Peltzer, Jr., to Merco Centrifugal Co., San Francisco, Calif. No. 2,310,651. Feb. 9, 1943.

Meat Products Packaged in Cellulosic Casings Cooked by Electric Conductance—Enoch L. Griffith, to Griffith Laboratories, Inc., Chicago, Ill. No. 2,310,690. Feb. 9, 1943.

Poultry Mechanically Split and Dressed Without Disruption of Viscera — Levi George Swanson, Perry, Iowa. No. 2,310,881. Feb. 9, 1943.

Meat Products Processed and Shaped in Multiple Mold Unit—Frank H. Hoy, to Hoy Equipment Co., Milwaukee, Wis. Nos. 2,310,957 and 2,310,958. Feb. 16, 1943.

Fish Decapitated and Held in Deformed Position to Permit Mechanical Filleting Without Removal of Entrails — William Hutton, Monterey, Calif., to Seapride Packing Corp., Ltd. No. 2,311,176. Feb. 16, 1943.

Diabetic and Dietetic Food Made to Contain Sorbitol, Mannitol and Dulcin as Sweeteners — Joseph Kuderman, Detroit, Mich. No. 2,311,235. Feb. 16, 1943.

Nonacid Vegetable Juices Preheated to 212 Deg. F. and Homogenized Preparatory to Conventional Packaging and Heat Sterilizing—John G. Souther, Alameda, Calif., to Schwarz Engineering Co., Inc., San Francisco, Calif. No. 2,311,316. Feb. 16, 1943.

Milk Treated With Alkali-metal Caseinate to Convert Milk Calcium to Colloidally Dispersed and Nonionizing State in Presence of Alginous Stabilizing Agent — Victor Charles Emile Le Gloahee, Rockland, Me., to Algin Corp. of America, New York, N. Y. No. 2,311,343. Feb. 16, 1943.

Labels Removed From Beverage Bottles in Special Zone of Washing Machine Through Action of Violently Circulating Portions of Cleaning Liquid—James L. Herold, to Barry-Wehmiller Machinery Co., St. Louis, Mo. No. 2,311,391. Feb. 16, 1943.

Fermentation Rate of Maltose and Galactose by Yeast Increased Through Increased Oxygen Content of Introduced Air—Alfred S. Schultz and Lawrence Atkin, Bronx, and Charles N. Frey, Scarsdale, N. Y., to Standard Brands, Inc., New York, N. Y. No. 2,311,418. Feb. 16, 1943.

Zein of Corn, 100 Parts, Combined With 5-20 Parts Sorbitol and 20-50 Parts Triethanolamine to Form Plastic Film—Oswald C. H. Sturken, Closter, N. J., to Corn Products Refining Co., New York, N. Y. No. 2,311,485. Feb. 16, 1943.

Canadian Patents

Fat and Water Emulsion Stabilized For Use as Food Spread by Addition of Water-soluble Vegetable Gum Consisting of Tragon and Tragacanth—Arthur K. Fisher, La Grange, and Lawrence F. Culkin, Chicago, Ill., to John F. Jelke Co., Chicago, Ill. No. 410,398. Feb. 2, 1943.

Candy Centers Coated With Nut Meats and Other Loose Materials by Mechanical Means—Santy C. Petrilli, Chicago, Ill., to Walter M. Lowney Co., Ltd., Montreal, Quebec. No. 410,401. Feb. 2, 1943.

Sugar and Low-fat Powdered Cocoa Thoroughly Mixed With Small Quantity of Heated Water to Form Mass of Small Sugar Crystals Interlaced with Cocoa—Carter F. Jones and Walter Tresper Clarke, New York, N. Y., and Benjamin J. Zenlea, Ozone Park, Long Island, N. Y., to Rockwood & Co., Brooklyn, N. Y. No. 410,418. Feb. 2, 1943.

Cereals and Starch Subjected to Fluid Treatment or Under Vacuum Conditions in Rotatable Chamber Having Perforated Inner Walls Connected With Hollow Trunnions Through Which Fluid or Vacuum May Be Applied at Either or Both Ends of Container—Erich Gustav Hunzenlaub, Brentford, County of Middlesex, and John Heron Rogers, Kenley, County of Surrey, England. No. 410,467. Feb. 9, 1943.

Roasted Coffee Packaged in Gas-tight Flexible Bag From Which Oxygen Containing Air is Removed During Filling and Sealing—Harry Franklin Waters, Los Angeles, Calif. No. 410,494. Feb. 9, 1943.

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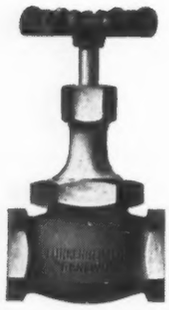

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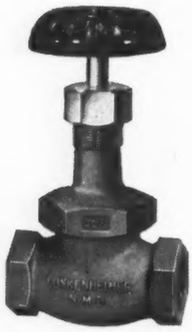

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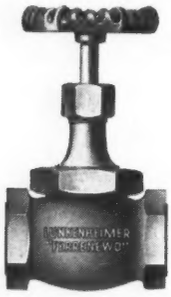

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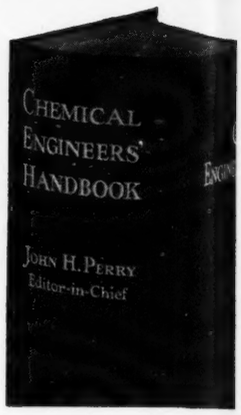

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Questions & Answers

Phosphoric Acid

Ohio—"A patron of this library wants to know the allowable amount of phosphoric acid which can be used in orange ade base in the manufacture of fruit beverages."

Phosphoric acid is not toxic, and as far as our files go, there is no jurisdiction that regulates the amounts which might be used. In a sense it is self-regulatory, for the reason that too much of it in the beverage would make it so sour that nobody could drink the resulting beverage.

If your patron wants an official rather than an unofficial opinion, he should write to the state food enforcement officer of Ohio. His name is George E. Kryder, Chief, Division of Foods and Dairies, Department of Agriculture, Columbus, Ohio.

Potato Dehydration

New Jersey—"Do you happen to know where I can get information regarding potato dehydration? I have in mind the establishment of a dehydration plant in the vicinity of my farm, which is in an intensive potato growing area."

There are no farm-size commercial dehydration plants that we know of. The smallest industrial size unit is produced by Cleaver-Brooks, Milwaukee, Wis. This is a sort of unit dehydrater costing about $15,000 and producing about a half ton a day. The Western Regional Laboratory has designed some smaller dehydraters of semi-industrial size for the Indian Service. Possibly one of them might be helpful to you. But it would require blanching equipment, boilers, and so forth.

Future of Dehydrated Foods

Massachusetts—"Your name has been been suggested to us by Mr. Roy C. Potts of the United States Dep't. of Agriculture. We are interested in obtaining information regarding dehydrated foods: just what you consider to be the outlook for this product after the war."

It may very well be that some of the products now being dehydrated to meet the demand of the armed forces will not be needed after the war. However, the equipment and the knowledge gained in producing these products can easily be turned to those that will then be in demand.

In general there are several considerations that make it likely that the dehydration of foods may continue on a large scale. The first is institutional feeding, including restaurants, transportation industries, roadside stands and all sorts of institutions. The advantage of dehydrated products in this connection lies in the fact that a large quantity may be kept on hand to meet a variable demand.

Another of the factors that makes us feel that many dehydrated products will remain on the market is the economy resulting from their production and use, and consequently the lower price. Transportation charges on this type of food are much less, and no refrigeration is required by the transportation agency, the wholesaler, the retailer or the ultimate consumer.

Vacuum Dehydration

California—"It is our understanding that a vacuum type of dehydrater is being developed to be used on vegetables. Do you have any information on this?"

Vacuum dehydration is just beginning to put in its appearance. In Oakland, Calif., the Vacudri Corp. has a vacuum method which is being applied mostly to the dehydration of so-called dried fruits. The method is patented. Several other methods are in development and may be announced within the next few months.

Vacuum dehydration takes quite a lot of critical materials for the construction of the equipment, but it does a splendid job.

Moisture Determination

Indiana—"We have been doing some work with the toluol method of determining moisture (American Dry Milk Institute Method) in dry milk products. In comparing this method with our results on the Mojonnier we find little or no relationship. The toluol method always yields results which are high.

"I don't know of any research which has been done regarding the comparison of the two methods and as a result was wondering if you could supply me with such information.

"There is information regarding the compatibility of the Mojonnier method and A.O.A.C. methods on various dairy products."

The toluol distillation method for the determination of moisture is considered to be rather unreliable. At least that is the opinion of men who are working in the field of dehydrated vegetables.

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FOOD TECHNOLOGY

NEW DISCOVERIES AND INVENTIONS

DAIRY PRODUCTS

Concentrated Milk As an Antioxidant

CONDENSED or dried milk may act as an antioxidant when added to fluid milk or to ice cream mixes.

Whole milk, either dried or condensed, was found to be more effective than the corresponding skimmed milk product. High-temperature treatment before condensing was not effective in improving the antioxidant properties, but superheating the condensed milk did give an improvement.

Best results were obtained when the concentrated milk was added to fluid milk before pasteurizing, and amounts as low as 0.2 percent milk solids-not-fat had a noticeable effect in decreasing the degree of oxidized flavor. In ice cream the additions were made so as to supply 2.5 and 8.75 percent of milk solids in the mix. Oxidized flavor was decreased or prevented in all cases. The larger quantity of dried skim milk gave a "powder" flavor, while the dry whole milk improved the flavor.

Digest from "The Prevention of Oxidized Flavor in Milk and Ice Cream by the Use of Concentrated Milk Products," by O. M. Russell and C. D. Dahle, *Journal of Dairy Science*, vol. 26, 25-35, January, 1943.

Bacteria and Oxidized Flavor

POSSIBLE relationship between oxidase-producing bacteria and oxidized flavor in milk was investigated. Pasteurized milk known to be susceptible to oxidized flavor was inoculated with representative groups of oxidase-positive milk bacteria cultures.

At the end of 4 days, at 39 to 43 deg. F., the flavor intensity in inoculated samples never exceeded that of the corresponding uninoculated control. When heavy inoculations were used, the average oxidized flavor was distinctly less than that in the control. These inoculations protected even those samples which had been treated with 0.1 p.p.m. of copper.

The inhibiting power depends both on the amount of inoculation and on the rate of growth of bacteria under storage conditions. Evidence is completely lacking that these organisms, chosen from the genus *Pseudomonas* and from Gram-negative rods, contribute to the development of oxidized flavor.

Digest from "The Role of Oxidase-Producing Bacteria in the Development of Oxidized Flavor in Milk," by J. F. Cone and C. J. Babcock, *Journal of Dairy Science*, vol. 26, 1-6, January, 1943.

Critical Study Of Pasteurization

THE problem of high thermoduric bacteria counts in milk which has been adequately pasteurized by short-time methods has been investigated by application of the principles successfully used in studying heat sterilization of canned foods.

Experience in the evaluation of canned-food processes, by demonstrating the importance of slope values of thermal death-time curves, shows a way to obtain lethality values of any pasteurization process, referred to that of the standard 30 minutes at 143 deg. F. The bacteria-destroying values of processes having various combinations of rate of rise and decline of temperature show that these periods must be taken into account in the scientific evaluation and comparison of a pasteurization process. Examples of the application of this technic to the conditions of short-time pasteurization are given.

Digest from "Short-time Pasteurization of Milk," by C. O. Ball, *Industrial and Engineering Chemistry*, vol. 35, 71-84, January, 1943.

BACTERIOLOGY

Differential Medium For Yeast Counts

CULTURE media which will permit estimation of yeasts and inhibit or prevent the growth of molds are needed in the beverage industry and in other food industries where yeast contamination is of primary significance. On standard media such as acid dextrose agar and malt extract or wort agar, the molds tend to overgrow the plate and mask or prevent the growth of yeasts.

When sodium propionate was added to a malt agar medium in sufficient concentration to inhibit all the molds, the yeasts were also inhibited.

Diphenyl, 100 p.p.m., will suppress molds and permit yeast growth in a satisfactory manner, but its insolubility makes it inconvenient to use and its volatility results in loss of fungistatic properties on prolonged incubation.

Tests are now being made to develop a water soluble, nonvolatile, substance possessing the mold inhibiting properties of diphenyl and without deleterious effect on yeast growth.

Digest from "A Fungistatic Medium for Enumeration of Yeasts," by M. R. Hertz and M. Levine, *Food Research*, vol. 7, 430-41, December, 1942.

CEREAL PRODUCTS

Thiamin in Rice

PRELIMINARY studies of thiamin content during milling of Arkansas-grown rice showed 1.83 to 3.07 micrograms of thiamin per gram of dry matter in the rough rice or paddy, and only 0.16 to 0.74 micrograms in the finished clean polished head rice sold for human consumption, an average loss of 80.2 percent. It is suggested that the hulls and bran, if properly extracted, might furnish considerable amounts of thiamin.

Trials have been made to retain a greater proportion of the thiamin. Parboiled rice is made by soaking rough rice, draining off the water, steaming and drying before milling. Water-soluble vitamins diffuse into the interior of the kernel and milled parboiled rice showed 1.35 to 1.74 micrograms thiamin per gram. Under-milled rice, with more of the bran coat left on, also has shown higher thiamin values. Experiments are being continued on parboiled and under-milled products.

Digest from "Thiamin in Products of Commercial Rice Milling," by M. C. Kik. *Cereal Chemistry*, vol. 20, 103-109, January, 1943.

FISH

Detecting Spoilage

SPOILAGE changes in fish begin at the surface, and determinations to detect incipient spoilage in fish fillets should be based on samples taken from the surface, rather than on composite ones.

Contact plate counts and determination of pH, tyrosine and trimethylamine were used on cod and haddock fillets stored at 32, 41 and 50 deg. F. Trimethylamine gave the clearest indications of spoilage changes, but all three

chemical tests showed almost complete agreement.

At all time intervals after the first day of storage the surface values are much higher than the corresponding interior values. After 5 days at 41 deg. F. the surface values indicate that the fish has reached or is reaching a spoiled state, while tests on the interior of the same fillets would indicate that the fish is completely fresh.

Values for surface, interior and composite samples are reported.

Digest from "The Surface Concept in Measurement of Fish Spoilage," by A. J. Wood, G. J. Sigurdsson and W. J. Dyer, *Journal of the Fisheries Research Board of Canada*, vol. 6, 53-62, 1942.

PLANT SANITATION

Necessary Precaution In Dehydrating

INSPECTION of a plant preparing dehydrated cabbage for Army use indicated the great danger of high bacterial counts in the product when inadequate or makeshift equipment and buildings are used.

Unsanitary plant conditions resulted in a product showing active enzymes and total bacteria between 90,000 and 7,561,000 plate count for samples having less than 5 percent moisture. Viable bacteria decreased during storage in sealed tin containers, but after 10 weeks an average count of 10,000 was obtained. The product possessed a foreign flavor and odor when rehydrated after 10 weeks.

Improvements in plant conditions and use of effective blanching gave samples showing negative enzyme tests. Out of 37 samples taken from the production line, 25 showed no bacterial contamination, 7 more gave counts under 100, and the highest count was 1,200.

Beneath the first two outside leaves, fresh cabbage is practically free from bacteria. It is pointed out that the use of pitchforks or other sharp-pointed implements in handling the cabbage may transfer surface contamination to the inner, bacteria-free portions.

Digest from "Sanitation Aspects of Vegetable Dehydration Plants," by J. H. Kintner and P. D. DeLay, *The Army Veterinary Bulletin*, vol. 37, 12-19, January, 1943.

ENGINEERING

Filtration Equipment

FILTERING apparatus used for whiskey before bottling consists of a primary unit to remove barrel char and a secondary or polishing installation to remove remaining fine char. Operating data for the preliminary filters indicate that the plate-and-frame type using filter paper and diatomaceous earth gives lowest operating cost. In these tests a pulp filter handled the largest volume throughput before repacking. It can be operated intermittently, but requires considerable labor to make the filter pads. Very high flow rates per square foot of filtering area and low operating costs were obtained with a precoated stone filter. The stone filter, however, could not be operated intermittently and required much attention at the beginning and end of each operating cycle.

Cotton spool, pulp and stone filters were tested as polishing strainers. A small stone filter, without precoat, showed many adantages and gave practically foolproof operation.

Digest from "Processing Equipment for Whiskey Filtration," by R. O. Schmitt, P. J. Kolachov and H. F. Willkie, *Industrial and Engineering Chemistry*, vol. 34, 1135-38, October, 1942.

Beer Filtration

IN beer filtration the amount of solid matter to be removed is relatively low, the particle itself is small and slippery, and the specific gravity of the foreign matter to be removed is near that of the liquid. The nature of these particles makes it impossible to clarify the beer by screen filtration with pores smaller than the particle size. Filtration therefore must be through a porous medium, with moderate pressure.

Two types of filters are considered. The filter-mass filter, using purified cellulose fiber formed into cakes supported on coarse drainage screens or grids, acts partly as a screen and partly by adsorption of the smaller colloidal particles. These filters are inefficient when the prefilt contains excessive, relatively coarse, suspended matter or very fine particles which are not properly adsorbed by the pulp. Seitz disks are a special type, acting both as screen filters and by adsorption, which remove from suspension all the microorganisms as well as other undesirable particles, so that the beer at the outlet of the filter is sterile. If any considerable amount of solids must be handled, a prefiltration by some other method is desirable.

Filter-aid filters, using a powder such as kieselguhr, can clarify any beer that can be clarified by a pulp filter, and in addition they will economically clarify beers containing excessive quantities of solids in suspension.

Filter-mass filtration, for ordinary brew, will give a rate of about 100 bbl. per hour for 150 sq. ft. filter area. The life is limited, as the flow rate drops

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off badly at permissible top pressure when the face of the pulp becomes plugged with solids, or else the pulp loses its power to adsorb small particles and hazy beer comes through.

In the filter-aid filter, the filter medium is a layer or thin cake of filter aid deposited on a fairly coarse metal screen or fabric cloth by pre-coating. This filter cake has almost no resistance to flow and sufficiently fine porosity to retain the solid particles. Adsorption plays no part and clarity of filtrate is not affected by flow rate, except that during the early stage of filtration a too high velocity may sweep away the precoat from the supporting screen. As filtration progresses, the mixture of filter-aid particles and suspended solid impurities gradually builds up, increasing resistance to flow, and an increasing pressure must be applied to maintain a uniform rate of flow. This increase is not constant, being very slow at the start and eventually mounting at relatively great speed. The filter should be run at a constant flow rate until the top permissible pressure is reached, then at constant pressure and a diminishing flow rate until the flow rate becomes really poor. The pressure differential above which a practical output is not obtained is about 50 lb. per square inch, with 1 to 4 lb. of filter aid per pound of suspended solids on a dry basis, and a flow rate of $\frac{3}{4}$ to 1 bbl. per square foot. The filter cake rarely reaches a thickness greater than 1 in.

Digest from "Filtration and Beer Clarification, Some Technical Aspects," by F. L. Horine, *Wallerstein Laboratories Communications*, vol. 5, 171-80, December, 1942.

MISCELLANEOUS

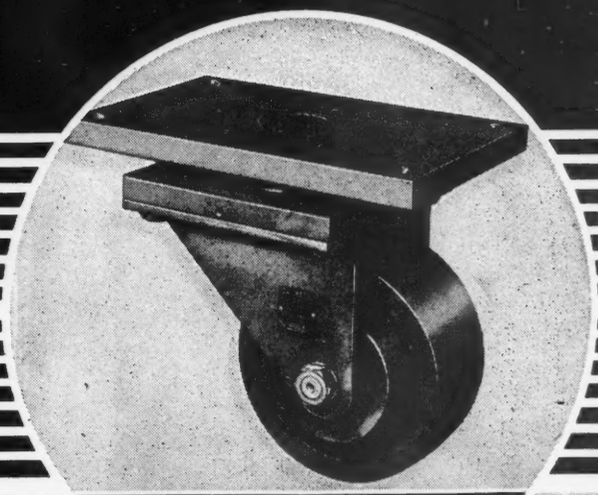
Sweetening Agents

ALTHOUGH hundreds of organic compounds taste sweet, relatively few are potent enough for practical use as sweetening agents. Still fewer can meet the requirements of low cost, availability, freedom from toxicity and other considerations. Saccharin, cristallose and dulcin have been able to find a market in Europe.

Cristallose is the hydrated sodium salt of saccharin. Referred to sucrose as a standard, the sweetening power of saccharin is 550; cristallose, 450; dulcin, 350. The lower sweetening power of dulcin is more or less fully compensated by its freedom from the bitter aftertaste observed with saccharin.

For all practical purposes, saccharin is entirely nontoxic. Dulcin is more toxic, since the lethal dose is only about 50 times the normal daily intake. This margin is ample for purposes of ordinary use but not for large accidental overdoses.

A SAVING AT EVERY TURN



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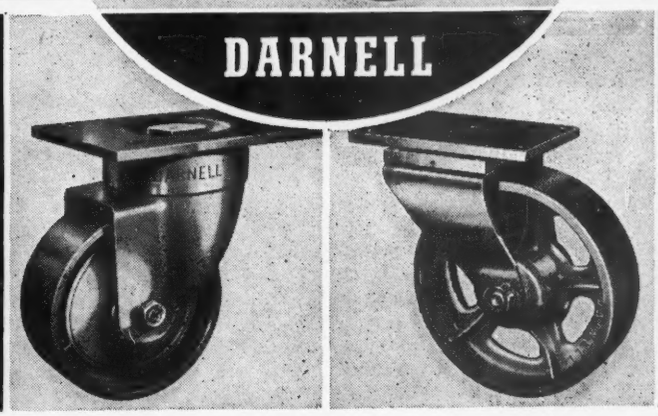

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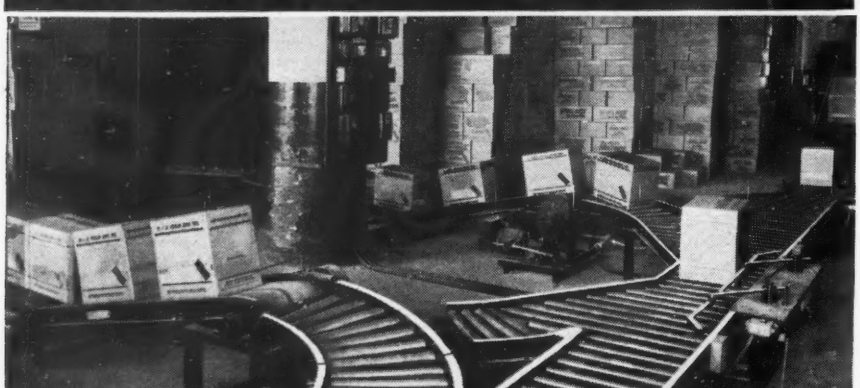

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Dulcin, as well as saccharin, is used in Europe for sweetening lemonade, wines and extracts. Toothpastes and mouth washes are also rendered more attractive by dulcin or saccharin.

Digest from "Synthetic Sweeteners," by H. Staub, *Schweizerische medizinische Wochenschrift*, vol. 72, 983, 1942 (Published in Switzerland).

Pure Rennin

CRYSTALLINE rennin has been made by a carefully controlled purification of commercial rennin extract. The pure crystallized rennin was found to be about 6 or 7 times more active than the commercial product, when comparison was on a salt-free, dry-weight basis. On a total-nitrogen basis the relative activity of the crystalline product was 18 to 21 times that of the commercial preparations.

Preliminary analyses of pure rennin showed carbon, 51.40 precent; hydrogen 7.19 percent; total nitrogen, 14.51 to 15.05 percent, sulphur, 1.46 percent; and possibly significant traces of phosphorous and copper. The sulphur content is higher than is usual in protein. The isoelectric point of the rennin was found to be in the zone of pH 4.45 to 4.65.

The method used in purifying rennin is based upon centrifuging rennin suspension, with very close control over such variables as protein concentration, salt concentration, kind of salt, pH, temperature, time, and conditions of dialysis. The procedure developed is designed to prevent losses in activity which may result from microorganisms natural to the rennet extract or introduced through contamination or from pepsin, alkalinity, high acidity or drying.

Digest from "The Preparation of Crystalline Rennin," by C. L. Hankinson, *Journal of Dairy Science*, vol. 26, 53-62, January, 1943.

Vitamin C in Walnuts

HIGH vitamin C values for edible walnuts (*Juglans regia*) reported by Gergelezhiu in Russia, have been confirmed, British workers having found 1.46 to 1.8 percent of ascorbic acid in fruit packed while the kernel is soft, just before formation of the shell. Modern preserving methods destroy the vitamins, but soaking in 15 percent salt solution for 24 hours and then packing in spiced vinegar will give an acceptable product of high vitamin C content. It is interesting that a method recommended in Mrs. Glasse's cook book, published in 1798, retains the vitamins.

Digest from "Walnuts as Source of Vitamin C," by H. S. Redgrove, *Food Manufacture*, vol. 17, 321, 1942 (Published in England).

BOOKS

Data on Vitamins

VITAMIN VALUES OF FOODS. By Lela E. Booher, Eva R. Hortzler and Elizabeth M. Hewston. Published by Chemical Publishing Co., Inc., 234 King St., Brooklyn, N. Y., 1942. 244 pages; 5¼x8¾ in.; cloth. Price, $2.75.

Prepared for dietetic and nutrition specialists, and based on information obtained from original published reports, this publication summarizes in tabulation form the vitamin content of foods.

Included in this record are values for 100-gram edible, portions for vitamin A, thiamin, ascorbic acid, vitamin D and riboflavin. These are determined in terms of absolute weights or directly in terms of International Units.

The tabulated vitamin data contain an alphabetized classification of such foods as meat, fish, fruit, vegetables, flour and nuts, for which some one or more values were available. The authors present briefly information important for the identification of the samples analyzed by the investigators and give a list of the literature cited.

Information on Peanuts

PEANUTS. Published by National Peanut Council, Inc., 812 Citizens and Southern National Bank Bldg., Atlanta, Ga., 1943. 83 pages; 5¾x7¾ in.; paper. Free.

Publication of this booklet is timely in that there is now an increased need for high-protein foods to supplement meat and cheese in the diet and also for additional sources of fats and oils.

Peanuts, peanut oil and peanut flour offer food technologists materials which can be used in developing new foods. Information on these products, as well as household recipes which provide a low-cost nutritive diet, are given in the booklet.

Food Production Trends

AMERICAN AGRICULTURE, 1899-1939: A Study of Output, Employment and Productivity. By Harold Barger and Hans H. Landsberg. Published by National Bureau of Economic Research, Inc., 1819 Broadway, New York, N. Y., 1942. 435 pages; 6¼x9¼ in.; cloth. Price, $3.

In this book is a wealth of information on the production trends of raw materials of food processors. And the information is presented in readable style and not as stodgy statistics so often compiled for a report of this type.

Among highlights of the report is the fact that American farmers are meeting the growing demands of the war effort much more efficiently than in World War I, though the effects of the recently developed shortage in agricultural labor were not evident when the book was prepared.

Farm output, the report shows, increased steadily from 1899 to 1930, fell in 1933 and 1934 and then rose rapidly again and now stands higher than ever before. The nature of farm production, of course, has changed to meet consumer demands. The output of citrus fruits was ten times as large in 1939 as in 1899. Twice as much sugar and dairy products were produced in the latter year as had been turned out 40 years before. But production of grains increased only slightly, and this increase was due entirely to their more extensive use for animal feed.

The average daily calorie consumption per capita fell from 3,600 in 1899 to less than 3,300 in recent years. But despite this decline in the amount of energy food eaten, people undoubtedly are better nourished, the report concludes. We now eat less cereals and meat products than our grandparents did, but we consume far more milk, butter, fruits and vegetables. Nonetheless, our consumption of vitamins and minerals is shown to be barely adequate—it provides little or no margin of safety.

In discussing the outlook for agriculture, the report examines the prospects for increased exports, larger production of protective foods and new industrial uses for oils, fibers and other farm products.

Conservation Hints

WARTIME CONSERVATION. Published by Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., 1943. 94 pages; 8½x11 in.; paper. Free.

How to conserve critical materials in the selection, application and use of electrical equipment in industry is told in this booklet. And there are suggestions as to how to get more production from present equipment. All types of equipment—distribution systems, motors, relays, transformers, lights and other units—are covered. While the book is written specifically for Westinghouse equipment, and the specific data are for that make, many of the principles involved in the suggestions apply to electrical equipment in general.

STOPS

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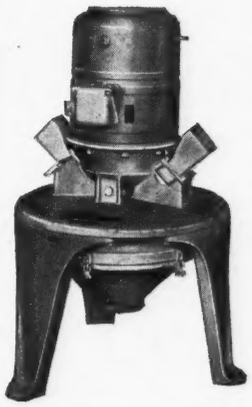

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ENGINEERS AND MANUFACTURERS SINCE 1872

Floors That Withstand Conditions of Processing

(*Continued from page 55*)

method are approximately one-sixteenth of an inch wide and, when set, are completely nonporous and inert to attack by any of the sugars, oils, fats, greases, acids, alkalis or other substances found in food plants. Another jointing compound is applied in molten form, being poured into the open joints of a brick floor. This cement is largely compounded of sulphur and synthetic rubber and also produces a joint which is nonporous and acidproof, but slightly less resistant to oils than the resin mentioned before. Neither of these two compounds may be used as a patching material, nor can they be installed by the average maintenance department, requiring special equipment and trained mechanics for their use.

The cost of brick floors jointed with such materials is not very much greater than that of floors, jointed with cement mortars, but the very much greater resistance of the jointing material gives a far longer service life without maintenance expense. In factories manufacturing such products as candied fruits, cake icings, sirups, soft drinks, buttermilk, cheese, pickled foods and the like, these floors seem to be the answer to hitherto insoluble problems of corrosion and wear.

With care in design and layout, the area of the more expensive type of corrosion-proof flooring can be held to a minimum and the attacking substances may be confined to spaces where they may be prevented from working harm to the rest of the floors.

Problems Have Been Solved

To sum up, it should be plainly realized that there is a flooring material available to fit almost any condition found in modern food plants at a cost easily within reach. The day is past when a plant could afford to allow its floors to get into miserable condition because "It doesn't pay to fix 'em, they just don't stay fixed." The problems *have been solved* and the knowledge is available to every plant manager who wants to take the trouble to write a couple of letters. Under the stress of wartime necessity, the great airplane plants, the radio manufacturers, the electrical, chemical and all the great processing factories have been forced to solve their floor problems to keep their products moving fast, clean and continuously—and the country's food plants may use this experience to even greater advantage in the battle for production.

The author wishes to thank Dr. C. R. Payne, well-known research chemist and authority on corrosion problems, for his helpful criticism during the preparation of this article.

Letter to the Editor

Waxy, Tuberous And Glutenous Starches

To the Editor
of FOOD INDUSTRIES:

The January number of FOOD INDUSTRIES contained a very interesting discussion of our current starch troubles by R. S. McBride. I enjoyed this article, so I hope the author will pardon my objection to his use of "tuber starch" as a synonym for "waxy starch." I know that the term "waxy" does not convey any clear-cut picture of what is meant, and it would be very desirable to find a more descriptive word to indicate that characteristic which makes the starch so desirable for the production of high-grade mucilages as well as for tapioca type puddings. The word "glutenous" has been used by some authors, and I believe this is an improvement over the word "waxy."

The absence of a really good word is, however, no excuse for using the wrong one. Actually, very few tuberous starches have the waxy characteristic, the chief one being cassava from which comes our well-known tapioca. Neither the sweet potato, yam, dasheen nor Irish potato has this desirable characteristic, whereas quite a number of varieties of grains are known to contain waxy starch. We now have available waxy varieties of barley, rice, corn and sorghum.

It is a characteristic that can readily be transferred through hybridization, and this has been well known to plant breeders for a good many years, but it was of only academic interest until we suddenly found our tapioca importation threatened. This situation caused greatly increased activity in plant breeding and a resurvey of all the available varieties. The Department of Agriculture has been very active in pushing this entire program. The development of waxy maize has been largely the work of Iowa

State College, while the development of waxy sorghum grain varieties has been carried along under the direct supervision of Dr. J. H. Martin of the Bureau of Plant Industry, U.S.D.A., Washington, D. C., the actual work being done at the experiment stations in Kansas, Texas and Nebraska.

In Nebraska the work has centered about the variety, Red Leoti, which is normally grown for fodder. In Texas, Kafir and Schrock are the two promising grain varieties. A new hybrid, Leoti X Club, developed in Kansas, appears to be superior to any thus far developed. All produce good waxy starch. The differences are in the yield, ease of milling and other features of economic importance.

Each of these varieties is being pushed this year, and it is expected that we will this fall have a substantial commercial crop available. The planting program extends from Nebraska and Kansas through Texas and Arizona all the way to California wherever suitable land is available for grain sorghum production.

From the chemical standpoint, the most important work has been done at the Iowa State College at Ames, Iowa, under the direction of Dr. Hixon. He has been able to measure the percent waxiness by a rather ingenious titration procedure. According to his determination, all starches, even ordinary corn starch, have some of the waxy type (branched chain) molecules, but in corn, potato, etc., the percent is too low to produce the "tapioca" characteristics. On the other hand, waxy sorghums and waxy maize actually have more of the "tapioca" characteristics than cassava from which tapioca has been produced in the past.

The best available figures for percent "straight chain" molecules in different starches are as follows:

Potato	21–24 percent
Corn	20–25 percent
Cassava	10–13 percent
"Waxy" maize...Less than	1 percent
"Waxy" sorghum.Less than	1 percent

In other words, the latter two are practically 100 percent branched chain, whereas tapioca is only 87 percent. However, the presence of small percentages of non-waxy sorghum seed tends to reduce the commercial product more nearly to the cassava level.—Aksel G. Olsen, *Director, Food Technology Section, Research and Development Department, General Foods Corp.*

The article referred to in the above letter to the editor is "Research Promises Relief From Starch Troubles," By R. S. McBride, published in the January, 1943, issue of Food Industries, *on page 56.*—The Editors.

AVAILABLE TO FOOD EXECUTIVES

A new brochure, "Science at Your Service", has been prepared for executives, plant managers, technologists and others in the food field.

War times present many new problems. New ingredients, new formulas, new processes, new packaging—vitamin retention, enrichment and control.

This brochure describes the facilities of our organization in helping you meet these problems. A copy will be sent upon request.

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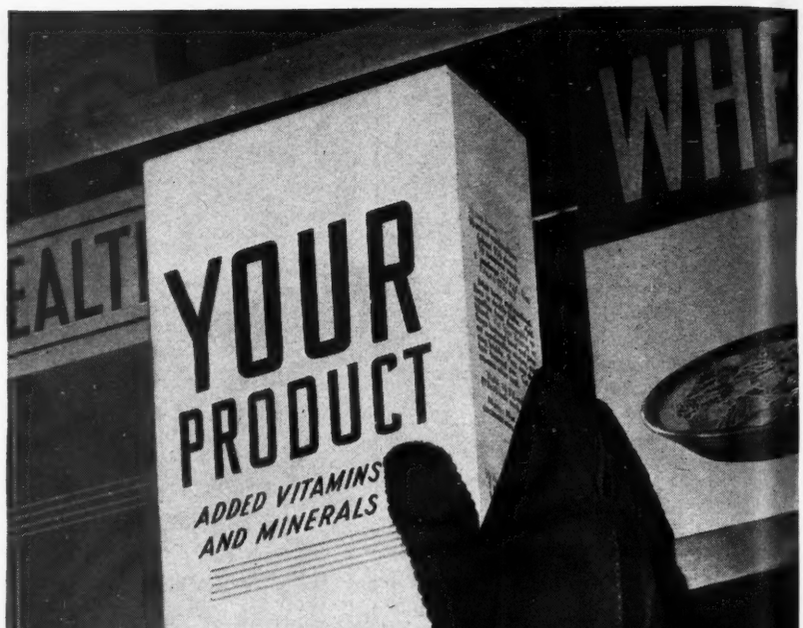

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In these days of shortages and rationing, the American housewife has found that selective shopping pays, because she can make comparisons and buy the product which gives her the best possible food value for her money.

With each advance in the National Nutrition Program—such as the recent stipulation by the Food Administrator that all white bread must be enriched with Vitamin B_1, Niacin, and Iron—label descriptions of vitamin content are receiving more attention from today's selective shopping public.

Have you ensured the present-day and postwar preference for your product by vitamin fortification? Usually it is not difficult nor expensive. The Merck technical staff and laboratories offer assistance in perfecting such factors as adequate distribution and retention of the vitamins, and product control methods.

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FORMULAS FOR FOODS

FORMULA NO. 397

Victory Graham Crackers

Sugar	15 lb.
Molasses	15 lb.
Standardized invert sugar	5 lb.
Salt	1¼ lb.
Water	20 lb.
Clear flour	80 lb.
Whole-wheat flour	20 lb.
Soda	1 lb.
Ammonia	¼ lb.
Shortening	15 lb.

Directions

Heat the sugar, molasses, invert sugar, salt and water to 180 deg. F.; the temperature of this sirup should be adjusted so that the final dough will be approximately 120 to 130 deg. F.

Separately blend the flours and the leavening agents. Combine the hot sirup with the flour blend and the shortening. Mix the dough smooth and run it while warm.

Other proportions of molasses, sugar and invert sugar can be used, such as a greater total, up to 55 lb., or less molasses and more sugar to make up a total of 35 lb. Increased amounts of molasses overcome the taste of the dark flours and produce a brown crust.

The taste and texture can be varied by using flour mixtures such as 5 lb. of bran, 5 lb. of a cracked wheat, 20 lb. of whole-wheat flour and 70 lb. of clear flour.

Formula from American Molasses Co.

FORMULA NO. 398

Mayence-Style Sausage

Lean pork neck trimmings	77 lb.
Pork rinds	23 lb.
Dry milk solids*	8 lb.
Blood	20 lb.
Salt	3 lb.
Sodium nitrate	2½ oz.
Nitrite of soda	½ oz.
Corn sugar	6 oz.
White pepper	5 oz.
Peppermint	3½ oz.
Ground cloves	2½ oz.
Marjoram	2 oz.
Mace	1½ oz.

* Not over 1½ percent fat.

Directions

Run pork through a 1-in. plate. Cook the pork rinds until tender, and grind twice through ⅛-in. plate. Put salt, nitrate, nitrite and corn sugar in 3 quarts of blood and stir well. Place the pork and pork rinds in the mixer and pour in the blood. Sprinkle in the dry milk solids and spices and mix well.

Fill hog stomachs with the mixture and cook at 190 to 200 deg. F. for two to three hours, depending on the size of the stomachs. The sausage should be stirred slowly for 15 to 20 minutes. If it is left undisturbed the blood will settle on one side.

Formula from American Dry Milk Institute, Inc.

FORMULA NO. 399

Swedish-Style Pan Rye Bread

Rye flour	20 lb.
Strong clear flour	80 lb.
Water (variable)	60–62 lb.
Yeast	2 lb.
Salt	1¾ lb.
Cane sirup*	14 lb.
Shortening	1¾ lb.

* Seven pounds of molasses may be substituted for the cane sirup.

Straight Dough Method

Dissolve the yeast in part of the water. Dissolve the other ingredients, except the shortening, in the mixer with the remainder of the water. Add the flour and follow with the yeast solution. When partially mixed, add the shortening and mix to a smooth, well-developed dough. The mixing time depends primarily on the speed of the mixer, the type of bread and the loaf volume desired. The temperature of the dough should be 80 deg. F.

The approximate time for the first rising is 1 hour, 40 minutes; the second rising is 40 minutes. Take to the bench in 20 minutes. Bake at 450 deg. F. for approximately 30 minutes.

Formula from General Mills, Inc.

FORMULA NO. 400

Peanut Brown Bread

Cornmeal	2 lb. 13 oz.
Graham flour	8 oz.
All-purpose flour	1 lb. 4 oz.
Soda	1½ oz.
Salt	1½ oz.
Peanut butter	1 lb. 1 oz.
Buttermilk	6 lb.
Molasses	1 lb. 5 oz.
Eggs	14 oz.
Raisins	1 lb. 6 oz.
Salted peanuts, chopped fine	1 lb. 8 oz.

Directions

Blend the peanut butter with the fine ground corn meal. Add the remainder of the dry ingredients and mix well. Combine the liquids and add to the dry mixture. Mix until smooth and fold in the raisins and the peanuts.

Fill well-greased molds about two-thirds full and steam 2½ hours.

Formula adapted from household recipe developed by National Peanut Council.

FORMULA NO. 401

Upside-Down Cake Topping

Red, pitted cherries	6 lb. 10 oz.
Butter or oleomargarine	8 oz.
Brown sugar	1 lb.

Directions

Drain liquid from the cherries and add the butter and brown sugar. Cook to make a thick sirup for approximately 10 minutes. Place the fruit in the bottom of a shallow cakepan and add the sirup. Pour a plain cake batter over the fruit mixture.

Bake in an oven at 350 deg. F. for about 35 minutes.

Variations: Cranberry sauce, berries, apricots or any combination of fruits may be substituted for the cherries in this formula.

FORMULA NO. 402

Oxtail-Type Soup Cubes

Corn flour	40 lb.
Potato flour	40 lb.
Pea flour	10 lb.
Bean flour	10 lb.
Dried onions	10 lb.
Dried turnips	10 lb.
Dried carrots	10 lb.
Salt	5 lb.
Ground cinnamon	8 oz.
White pepper	8 oz.
Beef stock	10 lb.
Beef extract	10 lb.
Boiling water	5 lb.

Directions

Chop the dried onions, turnips and carrots fine. Place all the ingredients, except the beef extract, in an iron steam kettle fitted with a stirrer. Heat and stir continuously.

Dissolve the beef extract in the boiling water and let it drip from an overhead container into the mixture in the pan, continuing to heat and stir until dry.

Press into cubes and wrap.

Formula from H. B. Cronshaw, Surrey, England.

Correction

In Formula No. 296, for Nut-Fruit Cuts, the ingredient listed as "Enzyme-converted corn sirup," should have been "Standardized invert sugar."—THE EDITORS.

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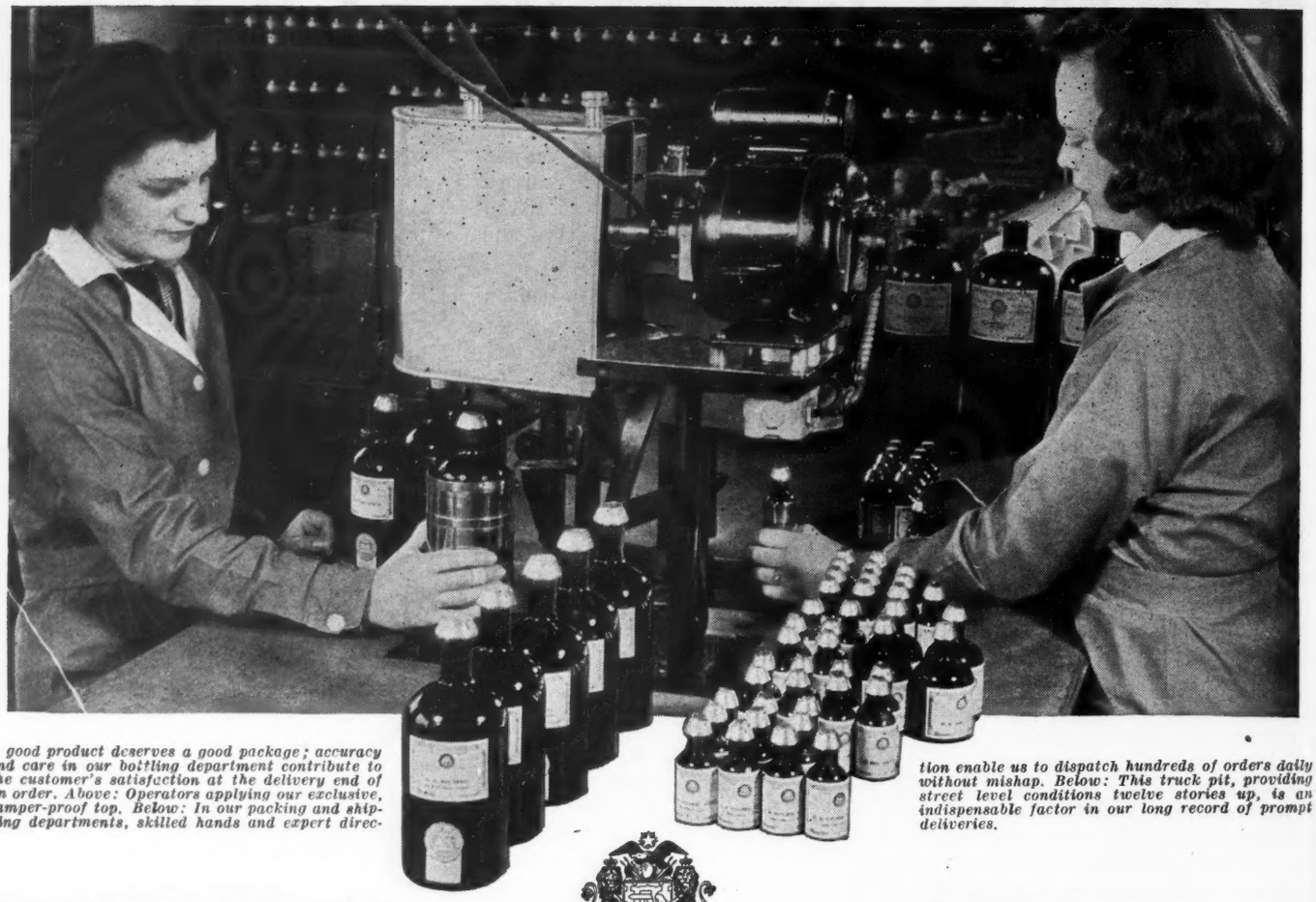

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100 lbs. of butter in that 1 oz. bottle? Not all the bulk, of course, just the *equivalent flavor* fresh from the MM&R flavor laboratories to you.

Nowadays when butter is being doled out in quarter pounds, the public's fancy for butter-flavored candies has hit an all time high. To many a confectioner appraising this butter boom, MM&R's Butter Flavor provides the answer at an almost unbelievably *low* price.

This laboratory-made flavor is oil soluble, thoroughly wholesome and has the rich aroma and fine flavor of fresh-from-the-creamery butter. It is available bottled in any size or variety of bottle sizes to fit your formula requirements, or it may be had in the usual large-size tin containers.

Write for a testing sample and schedule of prices today! Our analytical department will be happy to furnish advice as to the best method of employing Imitation Butter Flavor MM&R.

imitation

BUTTER FLAVOR MM&R

Oil Soluble · "D" Type

MAGNUS, MABEE & REYNARD, INC.

QUALITY ESSENTIAL OILS, BALSAMS, AROMATIC CHEMICALS, BASIC PERFUMES, FLAVORING MATERIALS . . . SINCE 1895

16 DESBROSSES STREET, NEW YORK CITY • 221 NORTH LASALLE STREET, CHICAGO

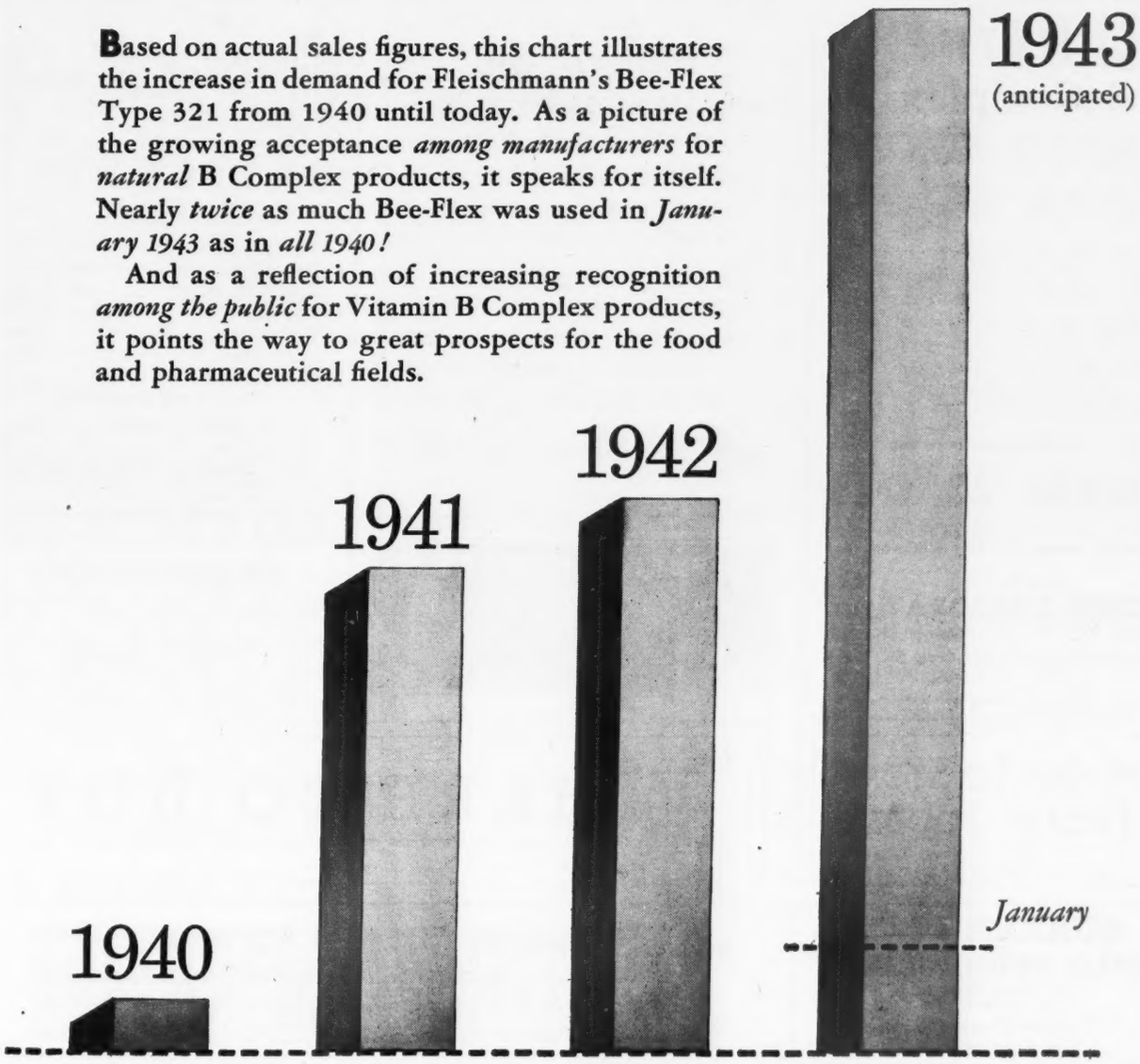
19-150

OFFICES IN PRINCIPAL CITIES • CANADA: RICHARDSON AGENCIES, LTD., TORONTO

How's this for "Natural" Growth?

Based on actual sales figures, this chart illustrates the increase in demand for Fleischmann's Bee-Flex Type 321 from 1940 until today. As a picture of the growing acceptance *among manufacturers* for *natural* B Complex products, it speaks for itself. Nearly *twice* as much Bee-Flex was used in *January 1943* as in *all 1940!*

And as a reflection of increasing recognition *among the public* for Vitamin B Complex products, it points the way to great prospects for the food and pharmaceutical fields.



POTENCIES PER GRAM

VITAMIN POTENCIES PER GRAM OF FLEISCHMANN'S BEE-FLEX TYPE 321 AS DETERMINED BY THE FLEISCHMANN LABORATORIES

Thiamine (B_1)	170 I.U.			Niacin (nicotinic acid)	500 micrograms
Riboflavin (G)	500 micrograms	*Plus*		Pyridoxine (B_6)	85 micrograms
				Pantothenic Acid	230 micrograms

and all the other known and unidentified members of the Vitamin B Complex natural to yeast.

Fortunately, Standard Brands Incorporated has *readily available* ample supplies of this economical and dependable source of B Complex vitamins. Our experts have had long experience in filling manufacturers' particular needs. Your inquiry will be welcomed.

STANDARD BRANDS INCORPORATED

Pharmaceutical Division — *595 Madison Avenue, New York, N. Y.*

MATERIALS
FOR THE FOOD MANUFACTURER

The *NATURAL* B Complex
WHEAT GERM
CORN GERM

Defatted, dehydrated, perfectly stable. Richer in B complex than original embryo. Rich sources protein of high biologic value. Among richest foods known in B complex and protein and mineral values, yet perfectly stable. Ideal materials to fortify cereals, drinks, candy, etc.

VioBin WHEAT GERM OIL

perfectly stable; requires no refrigeration; tocopherol content 3.5 to 4 milligrams per gram.

VIOBIN CORPORATION
36 Oak St. Monticello, Ill.
VioBin (Canada) Ltd., 637 Craig St., West, Montreal, Quebec

Why does CARROT OIL make foods golden yellow?

Because carrot oil contains carotene. Carrot oil is extracted from carrots, and each pound contains up to 25 million units of carotene, the international standard of vitamin A.

Carrot oil is preferred for vitaminizing foods because it is a natural vegetable oil, and because it contributes vitamin A of high stability and desirable golden yellow color.

Carrot oil is not synthetic, does not contain animal fats of any kind, and does not produce fishy flavor.

Also producers of ThiaBee, a stabilized wheat germ products rich in Vitamin B_1.

These vitamin products are of particular interest to all manufacturers of food products.

Inquiries are invited. Literature, prices and samples to firms requesting same on their letter heads.

NUTRITIONAL RESEARCH ASSOCIATES, INC.
201 Broad Street
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EST. 1866
and
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Tapioca Flour	Rice Starch
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Egg Albumen	Rice Flour
Egg Yolk	Potato Flour
Stabilizers	Soya Bean Flour
Corn Starch	Vegetable Gums

Granulated and Flake Tapioca
Pure Food Dextrines

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CHICAGO, ILL.

NEW ADVERTISEMENTS
received by April 19th will appear in the May issue, subject to limitations of space.
Address copy to
DEPARTMENTAL STAFF
FOOD INDUSTRIES
330 West 42nd St., New York City

WHERE TO STORE FROZEN FOODS

QUAKER CITY COLD STORAGE CO.
PHILADELPHIA, PA.
3 WAREHOUSES 3
Proper Temperature For Frozen Foods

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Interesting booklet concerning Inventions, Patents, Trade-Marks and Copyrights, together with schedule of Government and Attorney's Fees, sent without obligation. Simply ask for "booklet and schedule."
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Patents & Trade-Marks
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FOSTER D. SNELL, INC.
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Ask for copy of Bulletin 3W
302 Washington St. Brooklyn, N. Y.

WHERE TO BUY
Featuring additional Equipment Materials and Supplies for the Food Processing Industries

CANNING MACHINERY FOR FRUITS · VEGETABLES · FISH · ETC.
A. K. ROBINS & CO. INC. BALTIMORE, MD.
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PRODUCTS OR SERVICES

—not advertised in a particular issue of this magazine.

—ask the advertisers — or write us — and we will gladly ask them for you.

This Where to Buy section supplements other advertising in this issue, with these additional announcements of products or services essential to efficient and economical operation and maintenance.

Make a habit of checking this page, each issue.

Departmental Staff
FOOD INDUSTRIES 330 W. 42nd St. New York City

The CONFUSED FLOUR BEETLE

He's just a simple-minded bug. But he and his close relative, the rust red flour beetle, are about the worst insect pests of prepared cereal foods. They have a taste for other things as well —grocery products, peas, beans, nuts—even mustard and cayenne pepper! Oftentimes they leave a peculiar smell to the flour on which they feed.

FUMIGATE

Properly applied HCN gas is an effective fumigant for control of this and other insect and animal pests. Call on your local Pest Control Operator for a well-planned fumigation program.

We have a book containing interesting information about pests and their control by fumigation. Just drop us a line on your letterhead and we will be glad to send you a copy. E. I. du Pont de Nemours & Co. (Inc.), Electrochemicals Department, Wilmington, Delaware.

DU PONT
REG. U. S. PAT. OFF.

CYANEGG
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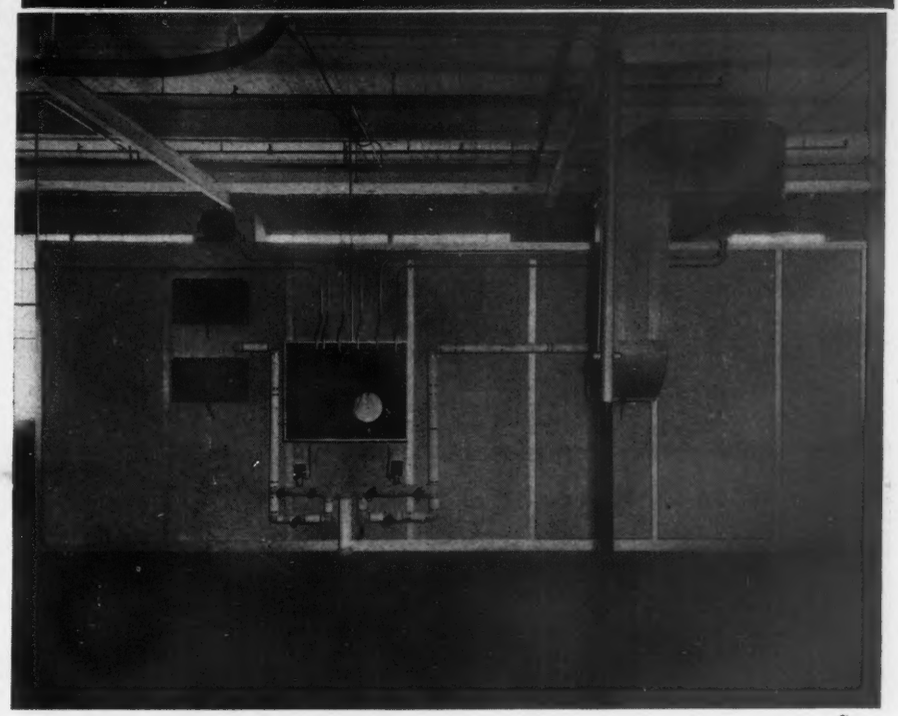
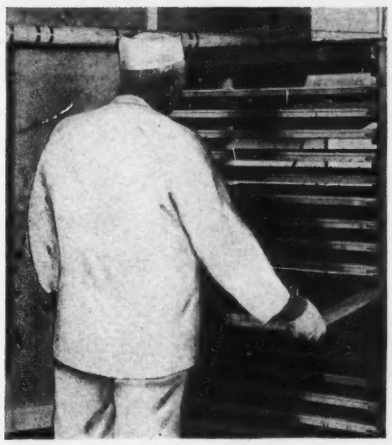
AN ECONOMICAL SOURCE
OF HCN FUMIGATING GAS

FOOD DEHYDRATION





You Can Maintain YOUR PRODUCTION By Getting Started With DEHYDRATION

YOU can maintain your production by getting started with dehydration now . . . in spite of tin shortages and other restrictions. Now is the time to investigate . . . to promptly decide and get started in dehydration . . . to build your foundation for leadership in the rapidly expanding field of dehydrated foods . . . to help the war effort by helping to fill Government needs for hundreds of tons of dehydrated foods.

You Can Get Started Sooner With "Industaire"

"Industaire" Dehydrating Equipment has all the important features that give you exceptional efficiency in dehydration. Because they are made to a large extent of non-critical materials, we can design, build and install your "Industaire" Dehydrator NOW.

Investigate Now. Write us about your product and let's discuss the possibilities dehydration offers you. Send for detailed, illustrated bulletin, without obligation.

INDUSTRIAL AIR COMPANY
Westwood, Massachusetts

Dehydration Engineering and Equipment

BIG VOLUME at Lower Cost ...with the ARDRIER METHOD of dehydration

That is the record of this safe, dependable, foolproof method, in the dehydration of forage crops and industrial by-products — and that is what it promises to deliver in food processing, after present redevelopment and adaptation has been completed . . . Because of its basic principle, the Ardrier method results in exceptional preservation of nutritive elements, attractive color, and natural flavor . . . Be a step ahead of the field in investigating this important development. Phone, wire, or write Arnold Drier Company, 3000 W. Montana Street, Milwaukee, Wisconsin.

A-4

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Make flavor go further with D&O

SPICEOLATES

"SOLUBILIZED" SPICE OIL FLAVORS

Solve one of today's big supply problems resulting from governmental restrictions on the use of spice oils with . . . SPICEOLATES.

These fine spice flavors can be used with considerable advantage—not only in replacing completely the dry spices you may now be using—but also to extend your present spice supplies.

WRITE US WITHOUT DELAY!

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U·S·S CYCLONE METAL CONVEYOR BELTS SPECIALLY DESIGNED FOR

Food Dehydration

THESE belts are practically made to order for transport of food particles during dehydration. They are strong, flexible, closely woven. Available in meshes as small as 3/32"—small enough to handle finely diced vegetables. Free passage of air is assured—for by far the larger part of the belt area consists of openings. **Cyclone Stainless Steel and Tinned Steel Belts** can well withstand the corrosive effects of the hot, humid air in food dehydrators. For other product conveyance, use galvanized Chain Link or Flat Wire Belts—available in a wide range of widths, weights and sizes of mesh.

Free Information. If you have problems of product conveyance ask for the help of our experienced engineers and let us furnish the necessary belts promptly.

CYCLONE FENCE DIVISION

(AMERICAN STEEL & WIRE COMPANY)

Waukegan, Illinois · *Branches in principal cities*

United States Steel Export Company, New York

USS CYCLONE Red Top METAL CONVEYOR BELTS

CYCLONE METAL DEHYDRATION BELTS

UNITED STATES STEEL

Important New Book for everyone who

GROWS, MANUFACTURES, or SELLS FOOD!

FOOD *for* PEOPLE

by Margaret G. Reid

653 pages. Illustrated. $4.00.

HERE is a book of wide scope, factual and authoritative. First, it examines the production of foods—considers home-processing versus commercial manufacturing.

Next, an abundance of facts on food consumption especially important to everyone marketing food products—Food Preferences, Changes in Food Habits, Food Consumption by Income Level, Consumer Purchasing Habits, etc. These chapters alone can well change much stereotyped sales-thinking, even in high food circles!

The last part deals with present food trends—considering such subjects as Taxes on Foods, Food Advertising, Grade Labeling, Control of Food in Wartime, etc.

If you earn your living by growing, manufacturing, or selling food—you will want this book now for immediate reading—and to have on hand for constant reference.

ON APPROVAL COUPON

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440 Fourth Avenue, New York, N. Y.

Please send me a copy of Reid's FOOD FOR PEOPLE on ten days' approval. At the end of that time, if I decide to keep the book, I will remit $4.00 plus postage; otherwise I will return the book postpaid.

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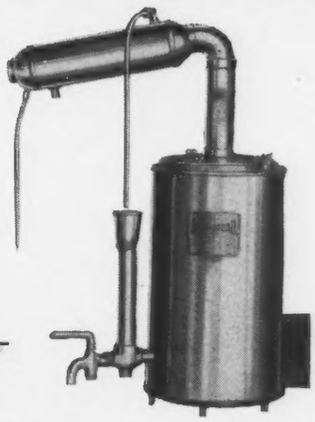
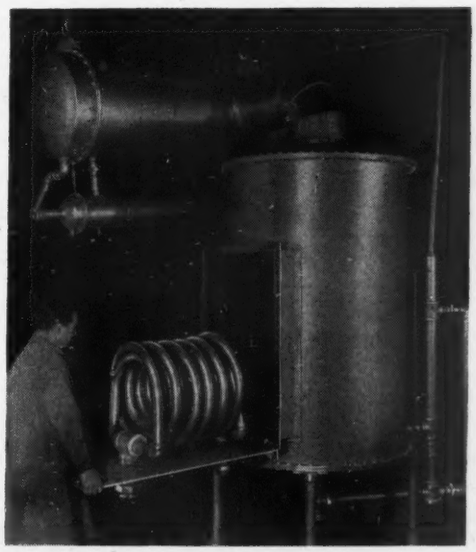
To Set Standards and to Keep Standards

Use Barnstead Water Stills



Use a Barnstead Water Still in your control lab and you're sure of eliminating variables that upset important work. Regardless of the ever-changing quality of your local water supply, a Barnstead Still will convert it into water which is extremely pure and *consistently* pure at all times.

Then, as a proper follow-up, use Barnstead Distilled Water in the actual production of your product. A large Barnstead Still will produce distilled water *of the same quality as your Barnstead Laboratory Still* at a very low cost.

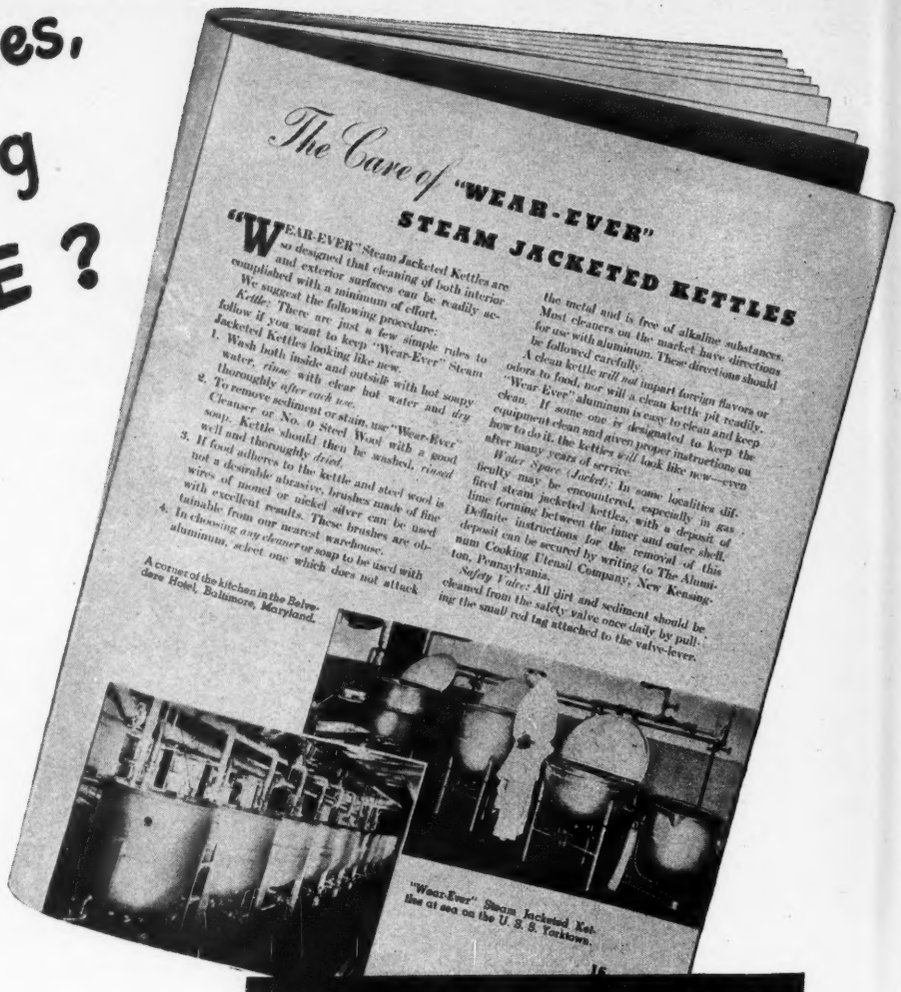


And remember, there's a Barnstead Water Still for every requirement. Small stills and large stills—ranging from ½ to 500 gallons per hour. Operation by gas, steam, or electricity.

Barnstead STILL & STERILIZER CO. Inc.

130 LANESVILLE TERRACE
BOSTON, MASSACHUSETTS

Are your kettles, too, working OVERTIME ?



The Care of "WEAR-EVER"
STEAM JACKETED KETTLES

"WEAR-EVER" Steam Jacketed Kettles are so designed that cleaning of both interior and exterior surfaces can be readily accomplished with a minimum of effort.

We suggest the following procedure:

Kettle: There are just a few simple rules to follow if you want to keep "Wear-Ever" Steam Jacketed Kettles looking like new.

1. Wash both inside and outside with hot soapy water, *rinse* with clear hot water and *dry* thoroughly *after each use.*
2. To remove sediment or stain, use "Wear-Ever" Cleanser or No. 0 Steel Wool with a good soap. Kettle should then be washed, *rinsed* well and thoroughly *dried.*
3. If food adheres to the kettle and steel wool is not a desirable abrasive, brushes made of fine wires of monel or nickel silver can be used with excellent results. These brushes are obtainable from our nearest warehouse.
4. In choosing *any cleaner* or soap to be used with aluminum, select one which does not attack the metal and is free of alkaline substances. Most cleaners on the market have directions for use with aluminum. These directions should be followed carefully.

A clean kettle will not impart foreign flavors or odors to food, nor will a clean kettle pit readily. "Wear-Ever" aluminum is easy to clean and keep clean. If some one is designated to keep the equipment clean and given proper instructions on how to do it, the kettles will look like new—even after many years of service.

Water Spaces (Jacket): In some localities difficulty may be encountered, especially in gas fired steam jacketed kettles, with a deposit of lime forming between the inner and outer shell. Definite instructions for the removal of this deposit can be secured by writing to The Aluminum Cooking Utensil Company, New Kensington, Pennsylvania.

Safety Valve: All dirt and sediment should be cleaned from the safety valve once daily by pulling the small red tag attached to the valve-lever.

A corner of the kitchen in the Belvedere Hotel, Baltimore, Maryland.

"Wear-Ever" Steam Jacketed Kettles at sea on the U. S. S. Yorktown.

16

Get your free copy NOW

The page shown above is not the only one that is important in the book, "Wear-Ever Steam Jacketed Kettles." It also tells you how you can conserve food and fuel, and how you can prepare better tasting foods. For your free copy, write THE ALUMINUM COOKING UTENSIL COMPANY, 304 Wear-Ever Building, New Kensington, Pennsylvania.

Your Wear-Ever Steam Jacketed Kettles are doubtless working long hours these days. Since new kettles are no longer available and repair parts are hard to get, you will want to take extra good care of the kettles you have.

Yes, there is another good reason to take care of your Wear-Ever kettles. To save money! Because aluminum conducts heat fast and evenly, develops no hot spots, less food is wasted by burning and scorching. Proper care means longer life for your Wear-Ever kettles.

When the war is won you will be able to buy better-than-ever Wear-Ever Aluminum products of all types. But in the meantime, get this book and use the tips it gives you on maintenance of your present equipment.

Wear-Ever Aluminum

WEAR-EVER ALUMINUM TRADE MARK REG. U.S. PAT OFF.

★ WHEN IT'S ALL OVER W-E WILL BE BACK! ★

HELP MAKE BULLETS

War workers need two things . . . material to work with and food. Every piece of machinery you obtain as new equipment or for maintenance takes just that many man hours away from bullet making and every time there is a stoppage for repairs in your plant, it's less food for workers and fighters. It is your duty to conserve metal parts and to keep your plant going.

That is why proper lubrication is of vital importance. That is why LUBRIPLATE is so widely used in the food industries. In addition to doing a better lubrication job, LUBRIPLATE prevents rust and corrosion even in the presence of many food acids. It withstands hot water and doesn't "wash out" of bearings. It is clean, it does not contaminate foods.

Just think what it would mean to you if you could double or treble the life of your bearings, reduce parts replacement and avoid unnecessary interruptions. That is what scores of bottlers, canners and other food packers are accomplishing with LUBRIPLATE lubricants. Your investment in machinery and your interest in the war effort are certainly great enough to warrant your investigation of LUBRIPLATE. Write today for a free copy of the "LUBRIPLATE Film" written especially for the food packer.

A FOOD MACHINE BUILDER WRITES

"We are rebuilding machines here. It is nice to hear the praise the boys give to LUBRIPLATE. We can appreciate it, especially when we get a machine to overhaul that has been using some cheap grease and we have to replace bearings, bushings and other worn parts."

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WRITE FOR THE NAME OF THE DEALER NEAR YOU

planning to buy **DEHYDRATION EQUIPMENT** ?

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The FLEET LINE DEHYDRATOR

It's new! It's different! It's surprisingly better!

IF YOU'RE IN A HURRY—

—don't wait for our May announcement. Write NOW and we'll send you advance information.

—Years of experience in making drying equipment plus a careful survey of the special requirements of the food industry are responsible for the Fleet Line Dehydrator.

RIGGS & LOMBARD

Incorporated

Foot of Suffolk St. Lowell, Mass.

OF DEHYDRATION EQUIPMENT

● *Gremlins... described in this recent advertisement from* TIME *and* BUSINESS WEEK... *may also be a headache in your plant.*

Like the "sub" Gremlins, they yield to the same treatment... MONEL.

MONEL combines strength, toughness, and resistance to corrosion ...it is uniquely fitted for food plant equipment where a combination of these qualities is so essential.

Keeping the Gremlins out

of Uncle Sam's Subs—

Gremlins, in airmen's lingo, are little elf-like men who like to (1) steal rides on planes (2) ball up the works.

Gremlins who haunt Flying Fortresses are said to wear riding boots and spurs. Those who inhabit giant flying boats affect high rubber boots.

These latter are first cousins of sea-going Gremlins with long rusty beards who would like to give our subs their unkind attention.

These Gremlins are of the genus *Corroso*. They wear rubber boots, bathing suits, diving helmets . . . and smoke big acrid pipes. They would love to get at vital parts of our submarines. They delight to work in the humid heat found in all underseas craft.

These Gremlins are not funny to Uncle Sam. Keeping them out of our subs is an essential and man-size job. The 30,000-plus precision parts of a submarine must function with split-second accuracy. Gremlins . . . and all other contributors to corrosion . . . must be kept under control.

That's why so many vital submarine parts are made of MONEL.

Tougher than any Gremlin, strong, corrosion-resistant . . . in fact, a metal that combines *all* the essential "sea-goin'" properties, MONEL keeps these willful little rust-beards out!

Today MONEL is doing as important a war job . . . in submarines, torpedoes and other front line assignments . . . as it does in industry, both in war and in peace, on the home front!

The International Nickel Company, Inc.
67 Wall Street, New York, N. Y.

★ ★ ★ **INCO NICKEL ALLOYS** ★ ★ ★

MONEL • "K" MONEL • "S" MONEL • "R" MONEL • "KR" MONEL • INCONEL • "Z" NICKEL • NICKEL

Sheet...Strip...Rod...Tubing...Wire...Castings

Available for 24-Hour Duty at Your Plant

the HTH "Sanitation Squad"

● Today packers and manufacturers of food products—dairies, meat packers and other important producers—are more careful than ever to prevent spoilage losses. The plain truth of the matter is that bacterial contamination hurts the war effort by detracting from the sum total of food production.

You can guard against this invisible menace in your plant with HTH products —HTH, HTH-15 and Lo-Bax. They are full-strength chlorine sterilizers in convenient dry form. When added to water, they form dependable, fast-killing hypochlorite solutions that make short work of bacteria. What's more, HTH Products not only minimize spoilage losses . . . but they safeguard the purity and quality of your food products. And they're as economical as they are effective. You can use them freely to flush, spray or wipe all surfaces with which food and beverages come in contact; also for general sanitation throughout the plant.

HTH Hypochlorite solutions are an effective germicide for use on floors, in locker rooms and cafeterias.

HTH PRODUCTS

THE MATHIESON ALKALI WORKS INC. 60 EAST 42ND STREET, NEW YORK, N. Y.

HTH PRODUCTS (HTH, HTH-15 and LO-BAX) . . . NUFOS . . . DRY ICE . . . CARBONIC GAS . . . CAUSTIC SODA . . . AMMONIA, ANHYDROUS and AQUA . . . SODA ASH . . . BICARBONATE OF SODA . . . LIQUID CHLORINE . . . BLEACHING POWDER . . . PH-PLUS . . . SYNTHETIC SALT CAKE . . . SODIUM CHLORITE PRODUCTS

MAILING LISTS THAT WORK...

McGraw-Hill Industrial Mailing Lists are a direct route to today's purchase-controlling executives and technicians in practically every major industry.

These names are of particular value now when most manufacturers are experiencing constantly increasing difficulty in maintaining their own lists.

Probably no other organization is as well equipped as McGraw-Hill to solve the complicated problem of list maintenance during this period of unparalleled changes in industrial personnel. These lists are compiled from exclusive sources, based on hundreds of thousands of mail questionnaires and the reports of a nation-wide field staff, and are maintained on a twenty-four hour basis.

Investigate their tremendous possibilities in relation to your own product or service. Your specifications are our guide in recommending the particular McGraw-Hill lists that best cover your market. When planning your industrial advertising and sales promotional activities, ask for more facts or, better still, write today. No obligation, of course.

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330 WEST 42nd STREET NEW YORK, N. Y.

Tomorrow's Fruit Juices WILL COME IN PACKAGES

Use Buell Powder Collectors with your Spray Dryers for Citrus Juices

Citrus juices in powder form, with all the "fresh fruit" flavor and goodness, will bring new convenience and economy to post-war kitchens. Right now, Government requirements call for 1943 production of 31 million pounds of *powdered lemon juice alone!*

In dehydrating citrus juices, milk, eggs, soups and other foods, Buell Powder Collectors are an essential part of efficient spray drying systems. Buell equipment virtually eliminates powder losses in the exhaust and frequently saves its cost in material recovered.

Buell Powder Collectors specially designed for food processing are made of special metals to meet all Pure Food requirements. Corners are rounded to prevent lodgement of material, and an ingenious hinged construction facilitates take-down for easy cleaning.

The high efficiency of Buell collectors is due to the patented van Tongeren cyclone—an exclusive Buell feature. Buell Powder Collectors have no moving parts, require little or no attention, will not clog, and cost little to operate.

Write for factual 28-page book "Bulletin G-842"

BUELL ENGINEERING COMPANY, INC.
8 Cedar Street, Suite 5000, New York
Sales Representatives in Principal Cities

BUY WAR BONDS AND MAKE THE AXIS BITE THE DUST

CONSULT BUELL *First* IN DUST RECOVERY
for Chemical • Rock Product • Metallic • Food • Flue or any other dusts

buell
POWDER RECOVERY SYSTEMS

Everyone concerned with FOOD PROCESSING *Will want to Own This Brochure*

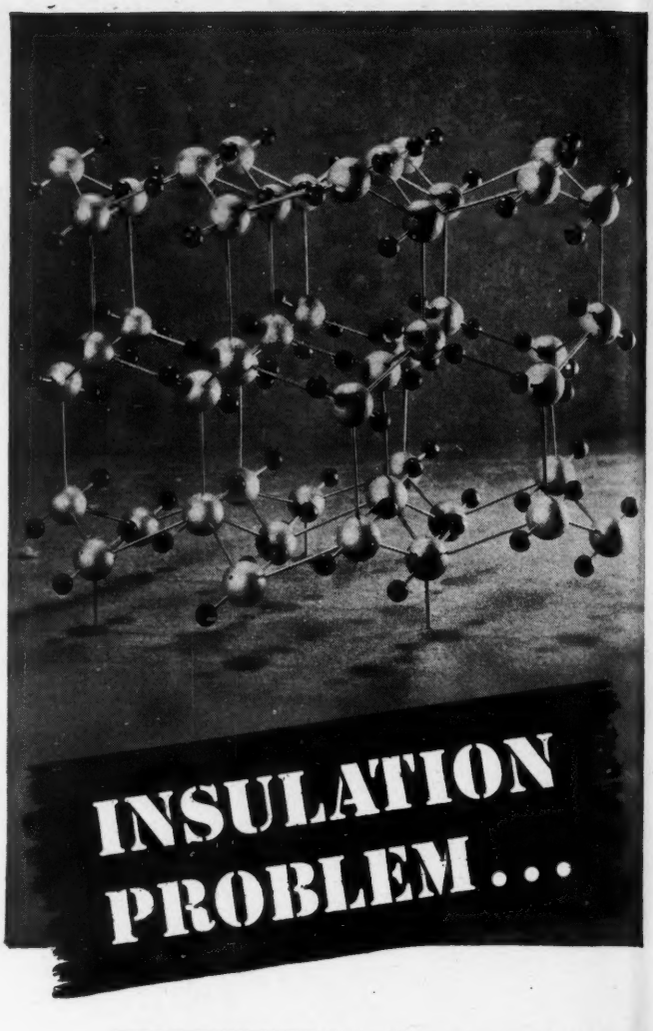
A study of the value of colloidal dispersion applied to many phases of food and beverage production. If your finished product goes through a grinding, emulsifying, dispersing or disintegrating process, send for your free copy of this brochure now. No obligation of course.

PREMIER

PREMIER MILL CORP.

218 GENESEE ST. · GENEVA, NEW YORK

New York Sales Office: 110 East 42nd St., N. Y.



INSULATION PROBLEM . . .

THE STRUCTURE shown above represents one of the fundamental insulation problems in refrigeration. It is, in effect, the "catalyst" in which vermin and mold breed . . . it favors the activities of termites . . . and it is the basic cause of rot. It is a physicist's representation of molecules of water . . . in crystal form, as ice. The small balls represent hydrogen atoms, the large balls oxygen atoms.

Water, or moisture, causes no insulation problems, however, when J-M Rock Cork is used for low-temperature insulation. For J-M Rock Cork is sealed against moisture . . . is immune to termites, vermin, mold. It can't rot, does not absorb odors.

Rock Cork is essentially mineral wool, one of 4 basic materials from which all Johns-Manville products stem: Asbestos, asphalt, diatomaceous earth and mineral wool.

Today, the prime task of Johns-Manville is to make these products as fast and as well as possible for war needs until Victory is won. Johns-Manville, 22 East 40th Street, New York, N. Y.

JM

Johns-Manville

ROCK CORK

Wire Stitched Shipping Containers Best Protect Your Goods in Transit or in Storage

Bliss Heavy Duty Bottom Stitcher

Latham Bottom Stitcher

Regular Slotted Containers with bottoms wire stitched are widely recognized as the strongest, most rigid and dependable containers available. Wire stitching utilizes the entire strength of the board and is unaffected by moisture conditions in storage or transit.

For your stitching equipment, it will pay you to investigate the machines illustrated here, before you buy.

THE BLISS HEAVY DUTY BOTTOM STITCHER is recommended for heavy duty, high speed, continuous production. Favorably known as the fastest, strongest, most durable and dependable Bottom Stitcher built.

IMPROVED LATHAM BOTTOM STITCHER is a moderate priced machine, recommended for stitching the lighter grades of corrugated and solid fibre containers, in all the usual sizes which do not require the heaviest kind of stitching. Has many features heretofore found only in the highest priced machines.

THE BLISS TOP AND BOTTOM STITCHER. Some products must now be shipped in completely wire stitched containers. This stitcher is recommended for plants or departments where one machine will handle the quantity of bottom and top stitching needed. Quickly changed for bottom or top stitching. Counterbalanced table for easy raising and lowering.

FOR STITCHING FILLED BAGS, the Boston Portable Bench Stitcher has been found practical and convenient, as it can be readily moved to the work to be stitched. Operates from light socket—solenoid operated foot pedal.

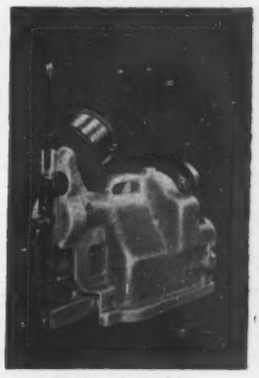
ASK FOR LITERATURE ON ANY OF THESE MACHINES

DEXTER FOLDER COMPANY

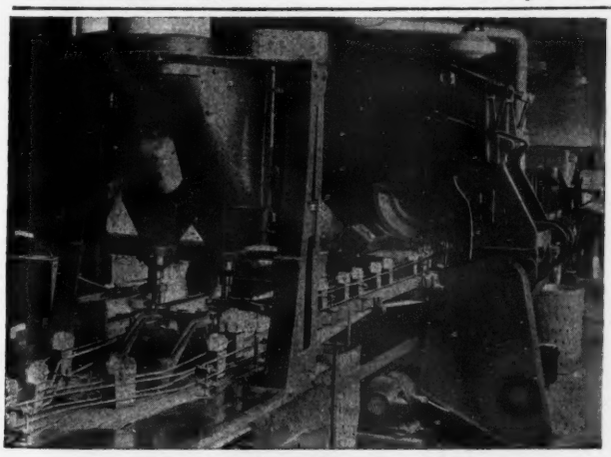
330 West 42nd Street, New York

Chicago—Boston—Philadelphia—Cincinnati

Bliss Top and Bottom Stitcher



Boston Portable Small Bag Stitcher



SYNTRON

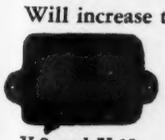
"Noiseless—Pulsating Electromagnet"

HOPPER VIBRATORS

Will increase the efficiency of your packaging machines—

Assure an ever ready discharge of material from other bins, hoppers and chutes—

By eliminating the "Arching-over" and "Hanging-up" of stubborn materials.



V-9 and V-15

CAPACITIES: The Model V-9 can be applied to hoppers of up to 2 cu. ft. capacity and constructed of 1/16" metal—the Model V-15, to hoppers of up to 7 cu. ft. capacity, of 1/8" metal.

Catalog information on request

SYNTRON CO. 460 Lexington Ave., Homer City, Pa.

AIR-COOLED AIR COMPRESSORS

Ingersoll-Rand air-cooled air compressors are compact, efficient units that may be easily installed without elaborate foundations. They are available in sizes from 1/2 to 90 horsepower. Piston displacements range from 1 to over 500 cu. ft. per minute. Pressures range from vacuum to 1000 lb. per sq. inch. Various types of mountings are available to suit the requirements of a particular installation. INGERSOLL-RAND COMPANY, 11 Broadway, New York, N. Y.

Ingersoll-Rand

1-274 FOR COMPRESSED AIR

...without a Well-fed Army of Production Workers...Our Fighting Armies Could Do Little . . .

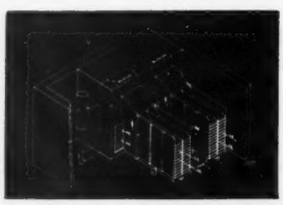
REFRIGERATION takes on an EXTRA wartime burden today . . . Compensating for rationed canned and processed foods . . . Preserving and making available more *fresh* foods to maintain the health, strength and energy of war workers.

Victory depends on Mechanical Refrigeration, for production efficiency on the home front *must* be maintained that battle fronts may be supplied with more armaments — and FASTER!

It's Vilter's gladly accepted responsibility to help YOU get more out of your present equipment — in extra food preserving capacity, longer life, at lower service and replacement expense. Call on a Vilter Engineer — any time.

VILTER FRIGID BLAST FREEZERS . . .

Vilter latest contribution to faster, more economical food freezing. Made in types and models for every need. Write for details.



Above — Small Type B Unit with open-end trucks moved against the FRIGID BLAST *Blower.*

Superior — Since 1867 — VILTER — Refrigeration... Air Conditioning

The VILTER MFG. COMPANY
2115 South First Street
Milwaukee, Wisconsin
Offices in Principal Cities

ARMY (E) NAVY

ARMY-NAVY "E"
Vilter Award for outstanding Achievement in War Production.

What Makes A Mailing Click?

● *Advertising men agree —the list is more than half the story.*

McGraw-Hill Mailing Lists, used by leading manufacturers and industrial service organizations, direct your advertising and sales promotional efforts to key purchasing power. They offer thorough horizontal and vertical coverage of major markets, including new personnel and plants. Selections may be made to fit your own special requirements.

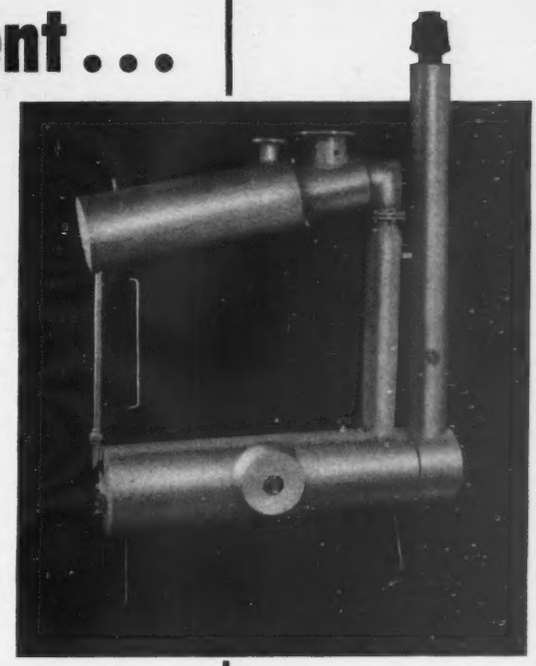
New names are added to every McGraw-Hill list daily. List revisions are made on a twenty-four hour basis. And all names are guaranteed accurate within two per cent.

In view of present day difficulties in maintaining your own mailing lists, this efficient personalized service is particularly important in securing the comprehensive market coverage you need and want. Ask for more detailed information today. You'll probably be surprised at the low over-all cost and the tested effectiveness of these hand-picked selections.

McGraw-Hill Publishing Co., Inc.
DIRECT MAIL DIVISION
330 WEST 42nd ST.
NEW YORK, N.Y.

Important Announcement...

A new pump that fills the gap between diffusion and mechanical types



The *Distillation Products Booster Pump, Type KB-100,* bears the distinction of filling the long-standing gap between diffusion and mechanical pumps for large commercial operations. It is ruggedly built, and either gas-fired or electrically heated. Note the radical improvement in capacity over the particular range covered:

ULTIMATE VACUUM	Below 25 microns	**HEIGHT**	6 ft. 3 in.
SPEED AT 200 MICRONS	300 l/s.	**LENGTH**	5 ft.
MAXIMUM FOREPRESSURE	Approx. 2-3 mm. Hg.	**WIDTH**	2 ft.
HEATER INPUT	6 BTU/sec.	**WEIGHT**	350 lbs.

Because of its immediate significance, this new Distillation Products development is offered to process industries for bona fide war uses. You are invited to write "High-Vacuum Headquarters" for further information, and to submit details of your pumping problem.

DP INC HIGH-VACUUM HEADQUARTERS

DISTILLATION PRODUCTS, INC.

Jointly owned by EASTMAN KODAK COMPANY and GENERAL MILLS, INC.

ROCHESTER, N. Y.

- CAPEM Screw Capping Machines are fully automatic.
- Seal from 2000 to 7500 containers per hour—LEAKPROOF.
- Save from 2 to 5 operators per machine.
- Handle jars, bottles or jugs of any size or shape.
- Use any type of metal or plastic screw cap—and certain acceptable substitutes.

Write for complete information

CONSOLIDATED PACKAGING MACHINERY CORP.

1400 WEST AVENUE BUFFALO, N. Y.

★ SPEED UP 8 DEHYDRATION PROCESSES

LA PORTE FLEXIBLE STEEL CONVEYOR BELTING

● **This flexible, stretchless, slipless, non-weaving and longwearing conveyor belting is engineered for peeling, slicing, coring, bleaching, draining, rinsing, drying and packing tables and other dehydration processes.**

The open mesh feature facilitates sterilizing with steam gun or scalding water.

The perfectly flat surface provides for carrying all types of containers empty or filled.

Ask your Supply House for LA PORTE Conveyor Belting in galvanized steel—available in any length and practically any width.

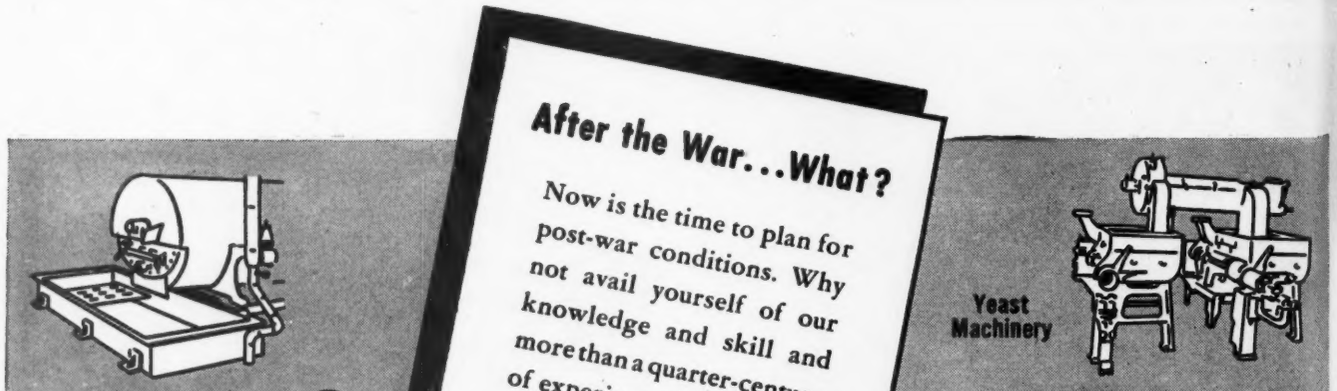
The LA PORTE MAT & MFG. CO.

BOX 124 LA PORTE, INDIANA

Like to have an AA-1 priority?

WPB wants no bottlenecks in food production . . . requests that manufacturers and processors take steps to keep supplies of maintenance and repair parts at normal levels . . . that orders be placed immediately if necessary to prevent such supplies, measured by past use, from dropping below normal.

Your Hottmann machines are essential to the war effort. They must be maintained at full efficiency. They are sturdy, long-lived machines, but they need good care and maintenance just as does any piece of mechanical equipment. If you need repair parts it will be mutually helpful if you anticipate such needs and give us ample time to fill all of them to your satisfaction.



After the War...What?

Now is the time to plan for post-war conditions. Why not avail yourself of our knowledge and skill and more than a quarter-century of experience in the manufacture of food processing equipment! Consultation is invited.

Put Your Mixing Problems up to

HOTTMANN

THE HOTTMANN MACHINE COMPANY

3325-47 East Allen Street • Philadelphia, Penna.

IS A PLANT SLOW DOWN WORTH IT . . . ?

IN PEACETIME, when a plant slowed down it was a matter of little consequence . . . and it cost no man his life.

But now, in war, a slow down at home may withhold vital equipment from our fighting forces throughout the world. Some soldier for lack of fighting tools may never see home again. Some sailor for lack of fighter protection may never set foot on land.

To keep faith with those we have sent overseas it is our duty . . . and our solemn duty . . . to send them the tools to fight with, and to send them "enough in time." To that end it is our duty *to keep plants on a full time basis.*

We can ward against one important source of slow downs by redoubling our peacetime efforts in the care and conservation of valves; for valves control every plant that uses fluids for power, processing, or as part of a manufactured product.

The way to do it is to avoid valve trouble before it starts . . . by regular, systematic inspection . . . by the replacement of worn parts in time to prevent valves from destroying themselves. See that new valves are selected carefully, and installed properly. And instruct new men thoroughly.

Jenkins Engineers will assist any management in preparing an effective program of valve conservation upon receipt of details of present valve problems.

Reprints of this advertisement are available for use in morale-building programs by writing to

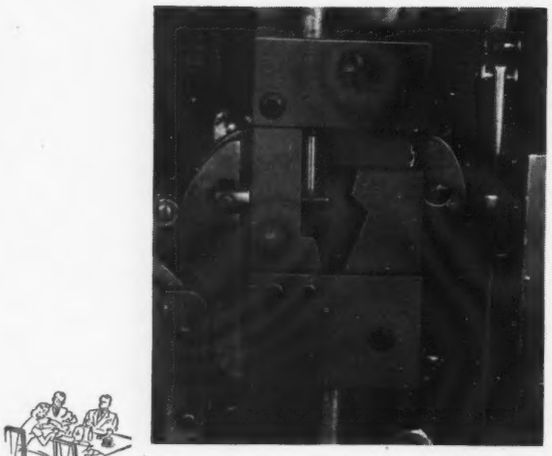
Jenkins Bros., 80 White St., New York, N. Y.; Bridgeport, Conn.; Atlanta, Ga.; Boston, Mass.; Philadelphia, Pa.; Chicago, Ill. Jenkins Bros., Ltd., Montreal; London, England.

JENKINS VALVES

SINCE 1864

For every industrial, engineering, marine and power plant service . . . in Bronze, Iron, Cast Steel and Corrosion-Resisting Alloys . . . 125 to 600 lbs. pressure.

better Methods with mechanical fingers



A connecting link assembly machine which replaces human fingers and eliminates the possibility of error.

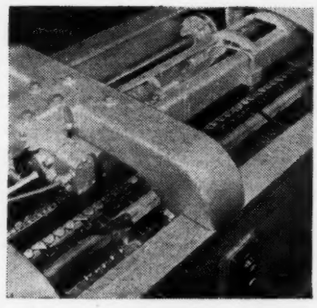
Machine designers have done amazing things in multiplying power and speed. Even more astonishing are their achievements in creating machine assemblies which perform work that previously only human fingers could do. Baldwin-Duckworth engineers, in constantly striving to give these designers and maintenance engineers the finest roller chain belts for power transmission and conveying tasks, have themselves designed outstanding machines to make them. This connecting link assembly machine, for example, completely replaces hand-sorting of non-symmetrical pins having a tenon at one end and a cotter pin hole in the other. Its mechanical "fingers" turn end-for-end, and place the pins correctly as they come from the hopper, eliminate all possibility of error, and assure a uniformly assembled finished product.

better Drives with Baldwin Roller Chain Belts

Roller chain belts provide better solutions for many drive problems. It is equally true that *better* roller chain belts give even better drives. This fact lends meaning to the precision methods of Baldwin manufacture. It accounts for the unfailing dependability, the split-second timing, jerk-free smoothness and virtually 100% efficiency which characterize Baldwin drives. It is worth remembering, too, that *chain belts are the* only *medium of power transmission that can absorb shock loading without loss of speed ratios or efficiency.*

Your Baldwin-Duckworth catalog will give you data on standard applications of chain belts, and for specialized applications a Baldwin man will supply any information you may require. He will be glad to work with you on transmission or conveying operations of any machine which you may be designing, adapting or which needs greater timing or driving efficiency. Baldwin-Duckworth Division of Chain Belt Company, 325 Plainfield St., Springfield, Mass.

EXAMPLE



This paper milk bottle forming and filling machine carries bottles from filling unit to sealing unit. It relies on Baldwin Roller Chain Belts for:

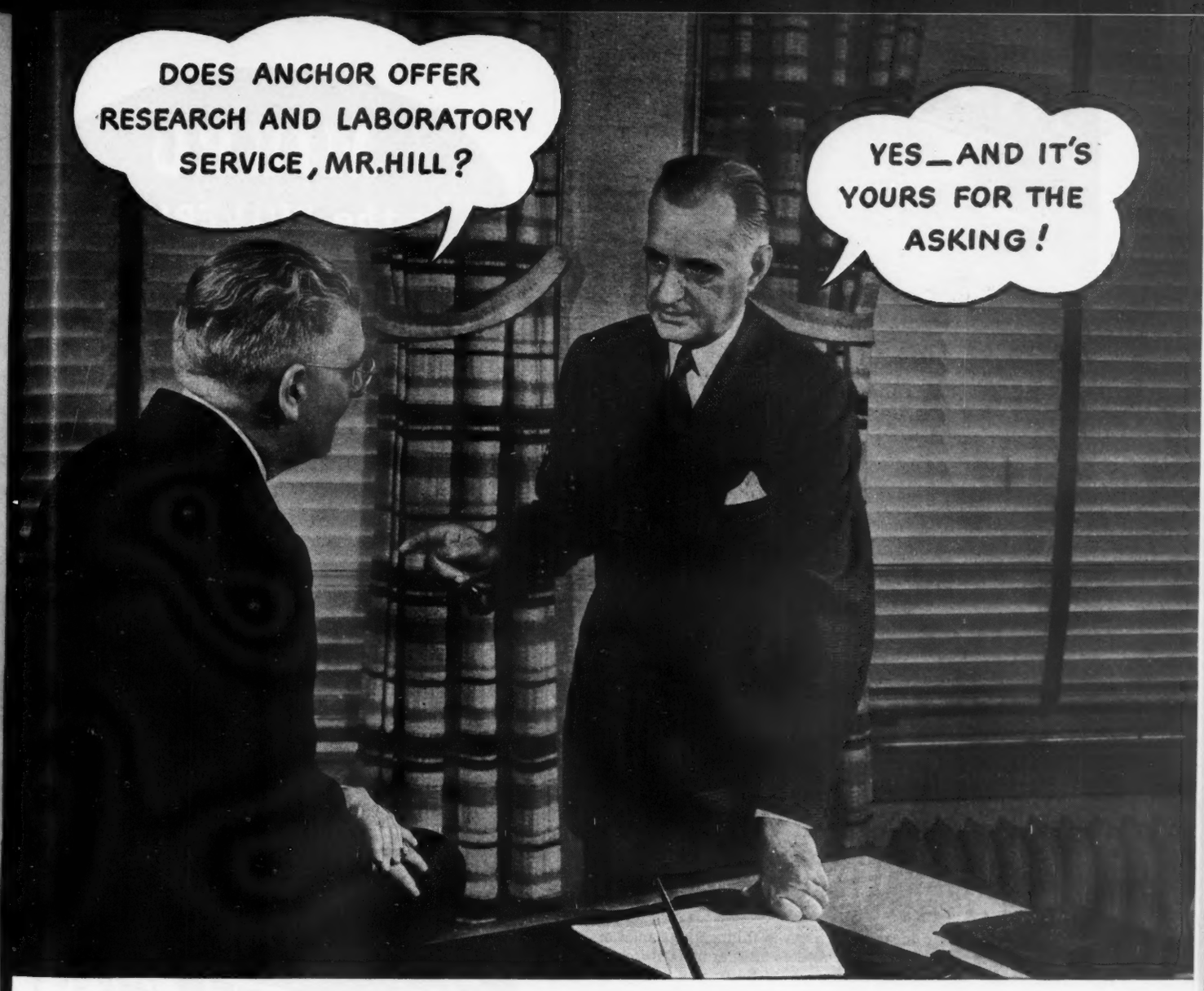
1. Split-second timing.
2. Continuous, jerk-free operation.
3. Virtually 100% efficiency.

IT'S BALDWIN-EQUIPPED

better Drives through better Methods

BALDWIN

ROLLER CHAIN BELTS



Today, products are being packed in glass that never were before. As a result, new problems are constantly arising. Suitable packages must be designed for products with wholly different chemical and physical characteristics. New processes are being developed. New and better liner materials, substitutes for metal closures and other substances, are always coming into the picture, to be tested, checked, approved, discarded.

That's why experience today is more vital than ever—knowledge based on scientific facts—not only about individual products, but also the variable factors that affect them. And experience means Anchor Hocking. Down through the years, the engineering and research experts in Anchor Hocking's laboratories have contributed many improvements—in the design, strength, weight and manufacture of glass containers... in closures, liners, sealing gaskets and sealing machines. The services of these laboratories—and the men who make them among the finest in the industry—are available free to any organization with a glass packaging problem.

J. O. HILL, one of Anchor Hocking's ablest and most popular men, has been a member of the Anchor Hocking family for 24 years.

ANCHOR HOCKING

GLASS & CAPS

ANCHOR HOCKING GLASS CORPORATION LANCASTER, OHIO

HOW TO KEEP BRANDS IN STEP WITH MARKETS ON THE MOVE

That defense job in another town is taking thousands of workers' families from home streets and familiar stores in the great wartime population shift. Sure, you sell your product in their new town—*but where?* Can those newcomers find *your* brand that greeted them like an old friend from the shelves of their home town stores?

Meyercord Decal Window Signs are the answer! They beam an invitation to shoppers every hour of every day with the compelling power of a beckoning hand. Durable, full-color, lustrous, washable, attractive, and utilizing no critical material. Decals are night-and-day, all-weather, out-of-the-backroom "point of sale" advertising that pack more publicity value per square inch for a longer period of time at lower cost.

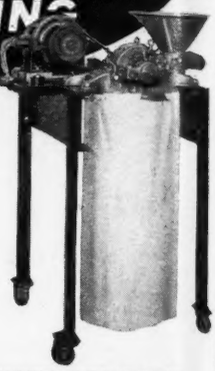
Spot Signs or Top-of-Window Valances, Back-Bar or Showcase Signs — all at prices that make Meyercord Decals an inexpensive point-of-sale dealer help and shopping reminder. Let Meyercord Decals point the way to your product. Free designing service. Samples on request. Write Department 1234.

Reverse side of sign illustrated above showing two-sided feature of spot signs.

50th Anniversary 1943
DECALS SAVE METAL

FAST • COLORFUL • DURABLE IDENTIFICATION
MEYERCORD DECALS
THE MEYERCORD CO., 5323 W. Lake St., Chicago, Ill.

MIKRO
is the PULVERIZER also used for GRANULATING and WET MILLING

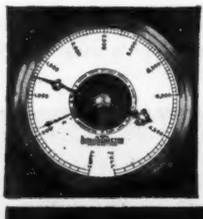


Versatile is the word for the Mikro! It processes hundreds of materials at lowest power cost—with unskilled labor. But the Mikro is also efficient — time saving — and cost saving when used for granulating and wet milling. Send for the Mikro-Pulverizer 32-page catalog. Or send samples of your material for a free laboratory test grind.

PULVERIZING MACHINERY COMPANY
97 Chatham Road • Summit, New Jersey

We Don't Grope Blindly When Measuring Valuable Stored Liquids... We Check With LIQUIDOMETER Tank Gauges
"THEY'RE ALWAYS DEPENDABLE"

Now, more than ever, industrialists realize the importance of having accurate measurements of their stored liquids available at all times. LIQUIDOMETER Tank Gauges insure true, convenient, hazard-free, 100% automatic readings. No pumps, valves, or auxiliary units required to read them. Models are available so that readings can be taken remotely from or directly at the tank. Remote reading types utilize balanced hydraulic transmission system which completely compensates for temperature variations on communicating tubing. Accuracy unaffected by specific gravity of tank liquid.



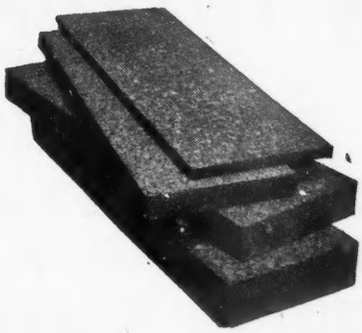
Approved for gauging hazardous liquids by Underwriters' Laboratories and similar groups.

Models available to automatically control pumps, motors, signals or other devices for maintaining minimum or maximum liquid levels.

Write for complete details

THE LIQUIDOMETER CORP.
38-14 SKILLMAN AVE., LONG ISLAND CITY, N.Y.

NOW YOU CAN USE CORK ON EVERY JOB



. . . and here's how you save by using NOVOID CORKBOARD

There's no shortage of cork in this country. The nation's stock piles are ample . . . large shipments are coming in regularly . . . so there *is* cork available in good quantities, without restrictions, for all low temperature construction.

That's mighty good news to those who know the real value of Novoid Corkboard. It's the most efficient of all low temperature insulating materials and can save in many more ways than just keeping operating costs down.

With efficient Novoid Corkboard, you need less refrigerating capacity to hold temperatures accurately. And you know what a saving that means today when securing equipment is one of your biggest problems.

Novoid Cork Insulation saves manpower, too, because it is so easily erected. And you don't need metal lath or lumber to hold it up.

Add to these savings, cork's freedom from maintenance expense—then you have an economy story no other insulation can match.

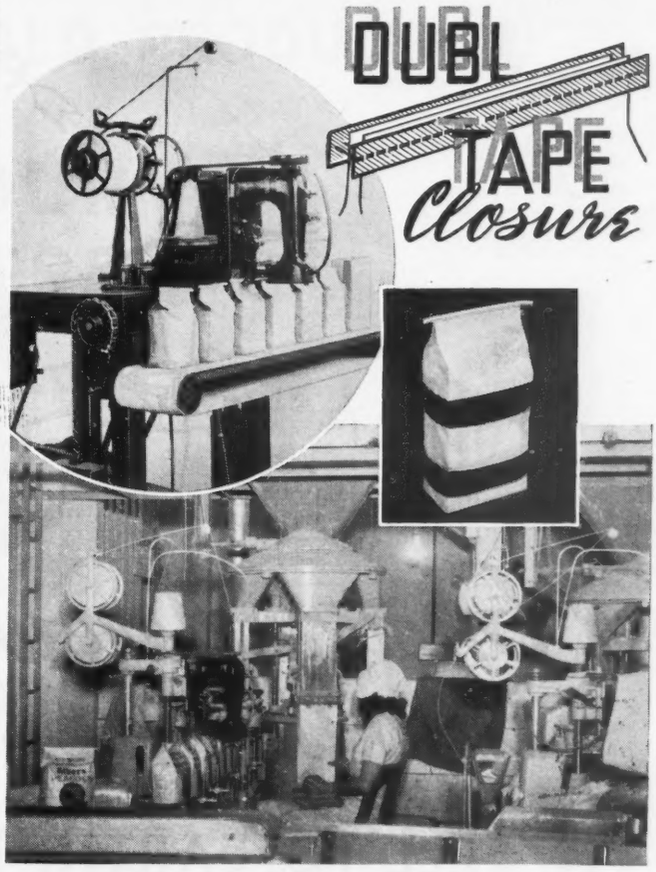
EFFICIENT NOVOID MINERAL WOOL BOARD ALSO AVAILABLE

This insulating material for general low temperature usage, is basically mineral wool mixed with waterproof binder. It equals or exceeds Federal Specification HH-M-371 for block or board insulation. Get the full facts now about Novoid Insulation. Write today to Cork Import Corporation, 330 West 42nd Street, New York City.

NOVOID INSULATION

Corkboard • Cork Covering • Mineral Wool Board

THE NEW UNION SPECIAL



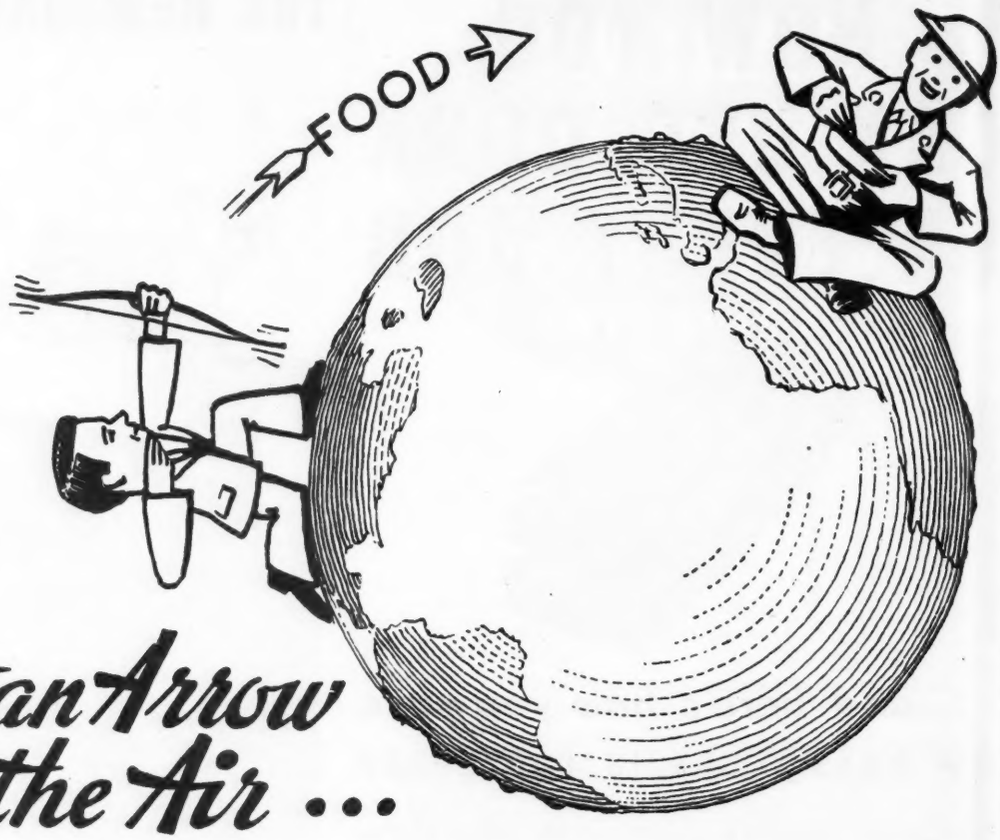
Makes Small Paper Bags Ideal Containers

FOR a neat, sturdy, sift proof, inexpensive package, you can't beat small paper bags closed with the Union Special Dubl-Tape Sewed Closure. The Union Special 60000 C sewing head is capable of handling the output of the fastest filling equipment. Operation is simple and can be made completely automatic. This machine applies a strip of tape to each side of the bag top, runs a secure stitch through the tape and bag, clips the tape and trims the bag top automatically.

For complete details on this modern high speed bag closer and other equipment for closing all sizes of paper or fabric bags, write today.

UNION SPECIAL MACHINE COMPANY
450 N. Franklin Street • Chicago, Illinois

Union Special Machine Company



"I Shot an Arrow into the Air ..."

[IT FELL TO EARTH, I KNOW NOT WHERE]"

The protective packaging of food has become unusually complex. It is no longer possible to know where your products will go, how they are going, or even when they will probably be consumed. Without this knowledge, and without many of the packaging materials you have been accustomed to use ... you must nevertheless be sure that your package is so constructed that no form of spoilage can occur.

We believe that Riegel Papers can provide a simple, sure and economical solution to such problems. Our facilities include paper machines, printing, laminating, waxing, lacquer-coating and other special converting processes that enable us to make over 130 different protective packaging papers. You will find these facilities of particular value today when the prevention of food spoilage in any form is an economical "must".

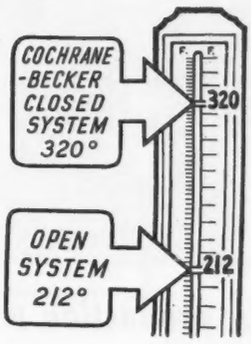
342 MADISON AVENUE • NEW YORK, N. Y.

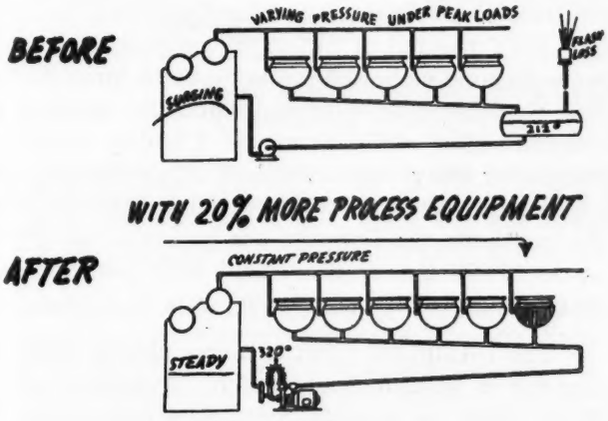
RIEGEL PAPER CORPORATION

IF DEHYDRATION EQUIPMENT
(OR OTHER INCREASED PRODUCTION)

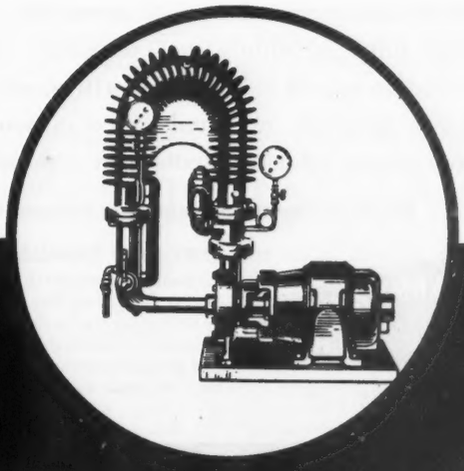
OVERLOAD YOUR PRESENT BOILERS

INVESTIGATE THE C-B SYSTEM OF CLOSED HIGH-PRESSURE CONDENSATE RETURN WHICH WILL SPEED UP THE REMOVAL OF CONDENSATE AND ENTRAINED AIR WITH NO FLASH LOSS... and give you these **PROVEN RESULTS**





1. *FASTER HEAT*
2. *HIGHER TEMPERATURE*
3. *UNIFORM HEATING*
4. *10 to 15% FUEL SAVING*

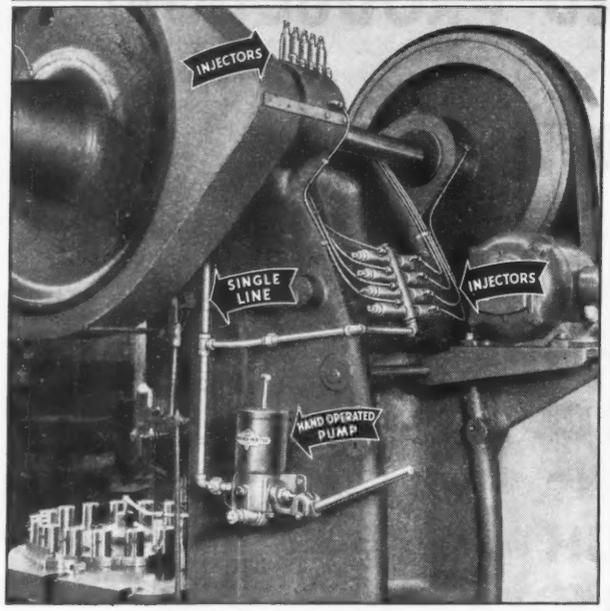


WRITE COCHRANE CORP. 3117 N. 17th ST. PHILA; PA.

COCHRANE-BECKER

System of High-Pressure Condensate Return

LUBRICATE ALL BEARINGS from a CENTRAL SOURCE



Equip war production machines with

LINCOLN CENTRO-MATIC LUBRICATING EQUIPMENT

Reduce the threat of bearing failures which cause maintenance shut-downs . . . Save machine-hours . . . Save man-hours—with Centro-Matic Systems.

The modern Lincoln method of lubrication makes it possible for *all* bearings on a machine, or a series of machines, to be lubricated from a central source—without stopping machines.

A Centro-Matic System consists of a number of Centro-Matic Injectors—one for each bearing—and a power operated or a hand operated Centro-Matic Lubricant Pump. A power operated system can be semi-automatic or fully automatic . . . Only a single lubricant supply line is required . . . Easily installed on new or old machines. (Illustration above shows manually operated Lincoln Centro-Matic Lubricating System installed on a punch press).

Write us today for complete information

ARMY E NAVY

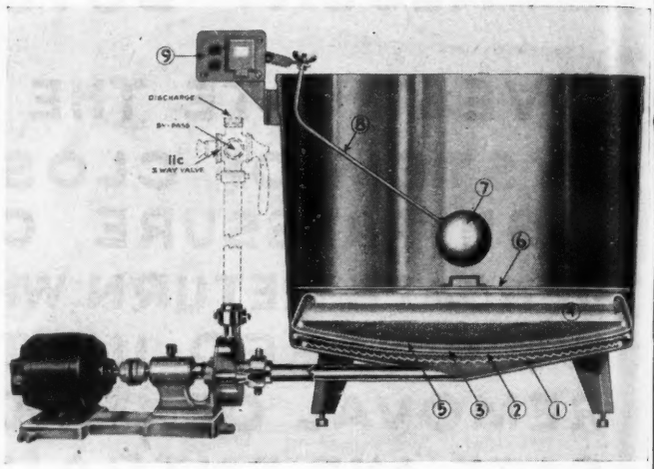
ARMY-NAVY PRODUCTION AWARD for high achievement in the production of war equipment has been conferred upon the Lincoln Engineering Company. It serves as inspiration toward greater and greater accomplishment until the time of final and complete Victory.

143-10

LINCOLN ENGINEERING COMPANY
PIONEER BUILDERS OF LUBRICATING EQUIPMENT
ST. LOUIS, MO.

DAMROW

Gravity Type FILTER



Offers Highest Capacity —Extra Large Filter Area

Fast, efficient, thorough, the DAMROW Filter is helping many plants to a new idea in high capacity filtration of all types of liquids. Operating on a new GRAVITY method, it builds up no pressure, cannot force dirt and sediment through. Extra large filtering area provides unusually high capacity, requires less frequent filter cloth changes. Filtering surface is visible for easy inspection and quick change when necessary. Rated at capacities from 5000 to 25,000 lbs. per hour, the Damrow has in actual use filtered up to 37,000 lbs. of Raw Cold Milk per hour—the first to successfully handle 40° milk in volume.

The DAMROW Filter is automatically controlled through a special float switch. Available also in DUAL Units to provide continuous operation. One filter can be used while cloth on second is changed.

Write for details on the DAMROW—an effective, economical and low cost solution to YOUR filtration problems.

DAMROW BROTHERS COMPANY
190 Western Avenue
Fond du Lac Wisconsin

Custom-Designers of TANKS, CONTAINERS for ALL INDUSTRY

It will be easy to learn the hard way that:

EACH DEHYDRATION PLANT SHOULD BE TAILOR MADE

A very satisfactory plant in Idaho would be entirely improper for Long Island. Peculiarly, the best plant for Long Island could be profitably revamped, if moved to Idaho.

Desired capacities should be specified for the time of the year when products will be available.

Unless the plant is desired to handle only one product, it should be flexible enough to handle all desired products — and different products involve widely different methods.

Best and most profitable utilization of present boiler and preparation equipment will decidedly affect the best dehydration cycle.

There are thousands of possible combinations. To cut and try for a good solution will be very expensive—and it is unnecessary too, since a proper balance can be predicted.

Kerby Saunders, Inc. can furnish the entire apparatus best suited for your requirements with each part selected to co-ordinate with the rest of the plant.

Supervision or complete field erection is included by erecting engineers with long experience in temperature and humidity apparatus.

With our purchases of millions of dollars of fans, heating and cooling equipment, controls, etc., the best equipment can be used without a price premium.

IN ADDITION TO DEHYDRATION, WE ALSO SPECIALIZE IN ALL TYPES OF AIR CONDITIONING AND REFRIGERATION FOR ALL FOOD INDUSTRY REQUIREMENTS.

KERBY SAUNDERS, Inc.

330 WEST 42ND STREET *Engineers and Contractors* **NEW YORK CITY**

DEHYDRATION • REFRIGERATION • AIR CONDITIONING

GOOD NEWS for all DIFUSOR OWNERS

VICTORY DIFUSOR LIQUID

The Alternate for Genuine Difuso

DIFUSO, greatest of all insecticides has gone to war.
But you don't have to put your DIFUSOR on the shelf!

After countless hours of laboratory research we have succeeded in producing an effective alternate for DIFUSO — "VICTORY DIFUSOR LIQUID." This is not DIFUSO, for nothing can be produced to match DIFUSO'S killing power. It is, however, a satisfactory wartime expedient, non-tainting, non-corrosive—the only alternate for genuine DIFUSO which will not endanger the mechanism of your now irreplaceable DIFUSOR. VICTORY DIFUSOR LIQUID is now obtainable from all TANGLEFOOT DEALERS. Ask for it by name.

FOR VICTORY *Buy War Bonds*

THE TANGLEFOOT COMPANY
Grand Rapids, Michigan

TANGLEFOOT DIFUSOR·DIFUSO

A NATIONAL SALES ORGANIZATION

Complete—Efficient—Experienced—Successful

—Is now available to function as *your sales staff* in distributing your product to one or more branches of the Food Industries.

We are now marketing our own specialty product to Confectioners — Bakers — Dairies — Ice Cream Makers—and Manufacturers and Jobbers of a wide variety of other food products.

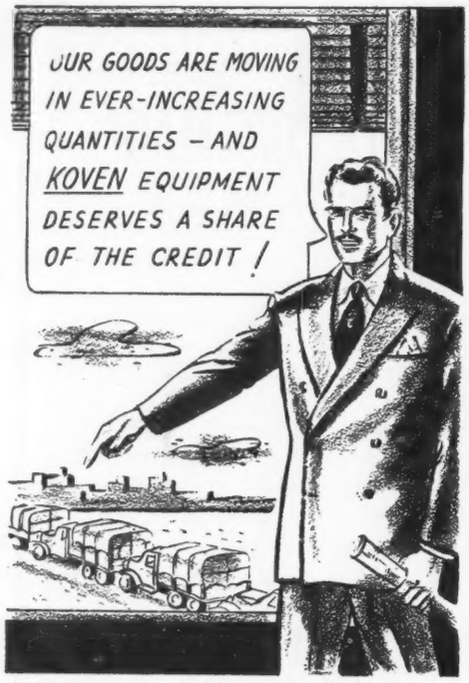
We would like to add several non-competing products to our line in order to utilize fully the services of an experienced and proven sales staff, located in strategic areas throughout the United States.

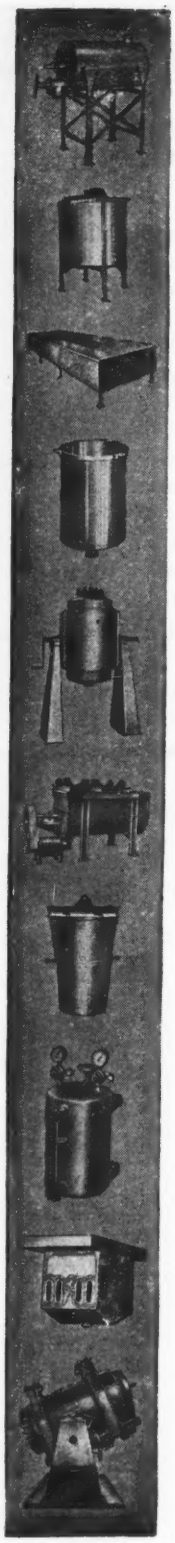
We are prepared to buy on our own account if so desired.

If you have a new product or new process which will contribute to the solution of our national food problem—we would like to help finance it or buy it outright.

Write to —

Box 121
FOOD INDUSTRIES
330 West 42nd Street,
New York, N. Y.





INDIVIDUALIZED EQUIPMENT IS THE KEY TO PEAK PRODUCTION IN THE FOOD INDUSTRY

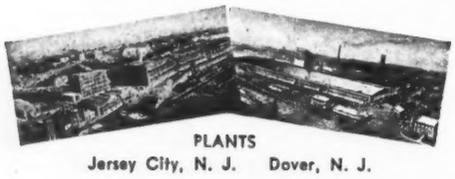
Never before has the food industry faced so compelling a challenge! . . . Food for the nation, food for the armed forces on distant battlefields, food for starved peoples the world over . . . all must be provided by American manufacturers!

Production on such an enormous scale can be achieved only with efficient equipment on the job. That is why, today, more and more food manufacturers insist on KOVEN individualized equipment . . . equipment specially designed and built to meet their particular needs . . . and assuring the utmost in efficient, economical production.

If equipment difficulties prevent you from hitting peak production in *your* plant, why not call in a KOVEN engineer *today* for a quick, constructive analysis—there's no obligation.

Among the many KOVEN products:

Stainless Steel
Aluminum Sheet Fabrication
Boxes, Tote, Waste Cans
Chemical Apparatus
Coils and Pipe Bands
Copper Sheet Fabrication
Galvanizing Work
Kettles, All Types, All Metals
Mixers, All Kinds
Monel Metal Fabricator
Pails, Special Heavy
Pans, All Types, All Metals
Sinks, Scullery and Factory
Tanks, All Types, All Metals
Tables, Galvanized or Monel
WATERFILM Industrial Heating Boilers



PLANTS
Jersey City, N. J. Dover, N. J.

L. O. KOVEN & BRO. INC.

154 Ogden Avenue
JERSEY CITY, N. J.

Plan and control dehydration with DESPATCH LABORATORY OVENS

Half the headaches of dehydration — before and during production — can be avoided by preliminary test-drying of small food samples in a Despatch laboratory oven.

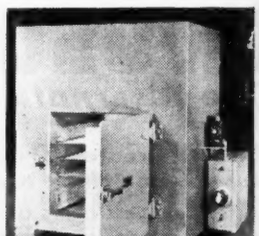
By handling *ounces* instead of tons of food, you save unnecessary waste and expense. And you get *all* the facts you need for full-scale dehydration: accurate data on best heat and airflow conditions for processing given batches of food.

This helps you in buying major equipment by indicating just what heat-air requirements must be fulfilled in the big units. And it gives you an easy, low-cost method of testing and sampling during production.

Gives Accurate Processing Data

Using a highly efficient forced convection heating system, Despatch ovens allow closest possible control of temperature and airflow through chamber.

Many food samples can accordingly be handled and tested with great speed and accuracy. You get the practical data you need in record time and with minimum expense and labor.



PROMPT DELIVERY ON WELL-RATED ORDERS

WRITE TODAY for full information about Despatch Laboratory Ovens, electric or gas-fired. Humidity control may be provided if desired. New Bulletin 105 now available.

STANDARD SIZES OF DESPATCH VICTORY OVENS

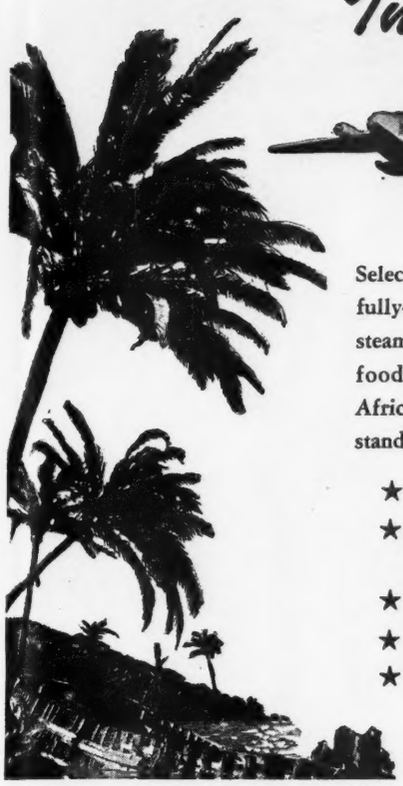
No.	Inside Dimensions	No.	Inside Dimensions
V- 5	13" x 13" x 13"	V-21	37" x 19" x 25"
V-13	19" x 19" x 19"	V-27	37" x 25" x 37"

Electrically or gas heated. Temperature range to 302°F (150°C.). Also available for temperatures to 500°F (260°C.)

DESPATCH OVEN COMPANY MINNEAPOLIS

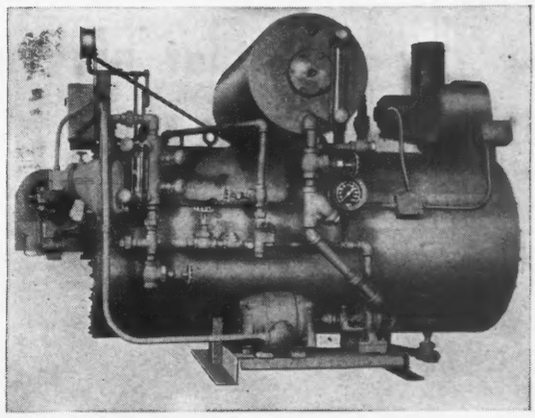
In Africa – NEW O&S BOILERS

are pioneering with PAN-AMERICAN AIRWAYS!



Selected for their hopping-off points—this fully-automatic boiler speedily develops steam needed for heating, laundering and food preparation in Pan American's African bases. O & S Boilers offer outstanding advantages:

- ★ **Exceptionally high efficiency!**
- ★ **100 lbs. pressure from 60° water in 20 minutes!**
- ★ **No stack necessary!**
- ★ **Easy to clean!**
- ★ **Compact -- less weight per H. P.!**

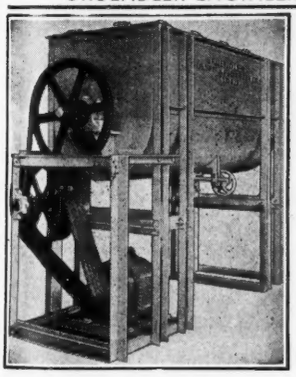


Although developed expressly for U. S. Army use, this unique boiler promises wide application in your industry when Victory makes O & S Boilers again available for all purposes.

ORR & SEMBOWER INC. READING • PENNSYLVANIA

O&S *Builders of Better Boilers Since 1885*

GRUENDLER ENGINEERS are READY to ASSIST YOU



GRUENDLER "MASTER"

BATCH MIXERS

(50 lb., to 4 ton Batch Capacities)

• • • with specially designed double spiral agitators for Moist, Dry or Liquid materials, have proven themselves time and again in the war effort and in peace time production.

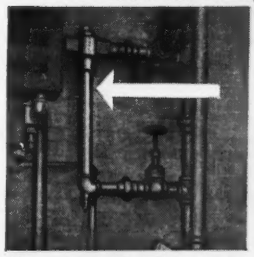
For continuous operation—Effective power transmission arrangement, together with massive bearing supports and foundation. Stainless Steel, Monel Metal and non-corrosive Linings on specification.

WRITE for DATA

GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE — 2915-17 N. MARKET • ST. LOUIS, MO.

SAVE WITH SARCO

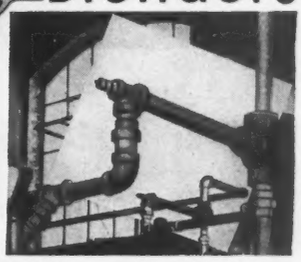
Water Blenders



Here is a simple, sturdy, thermostatic mixing valve of many uses.

It will mix hot and cold water to provide blended water at any desired constant temperature. When used in connection with gang showers or group wash basins, it preserves hot water storage and will often make unnecessary the acquisition of additional heater capacity.

It brings tempered wash water right to the point of use in dairies, packing houses, or sheet mills. It provides accurate proportioning control for photographic and X-ray film washing.



Used to recirculate a varying portion of the cooling water, it saves water and lubricating oil and protects Diesel engines, compressors, or condensers. On brine unit coolers, it provides an accurate, compact and inexpensive temperature control.

A special type is available also for submerged heating coils and tankless water heaters connected to heating boilers in large or small buildings, to prevent scalding hot water reaching bath room fixtures. Catalogs 700 and 800.

153

SARCO SAVES STEAM

SARCO COMPANY, INC.
475 Fifth Avenue, New York, N. Y.
Sarco Canada Ltd., Federal Bldg., Toronto, Ont.

Efficient final-stage dehydration is provided by the BRYANT Dehumidifier, *regardless of outdoor humidity*

Humid days are ahead! Days when it will be a major problem, with usual drying methods, to bring vegetables down to the extremely low moisture content demanded in dehydrated foods. Days when the Bryant Dehumidifier, more than ever, will prove its worth in difficult final-stage drying because, in its operation, *outdoor humidity need never be a factor.*

Teamed up with almost any dehydration system, this equipment will aid in bringing vegetables surely and safely to the specified moisture content. Air can be delivered as dry as necessary. Automatic regulation of this artificially dried air will permit the lowering of humidity progressively as the product approaches the final moisture content. This controlled capacity to absorb moisture will afford speedy drying, save time, and eliminate the need for risky heat increases which might cook out flavor or break down vegetable cell formation.

It's the *last* moisture that puts up the *toughest* fight against dehydration processes. It's the *humid* day that brings your *hardest* battle in this final-stage drying. But, your air conditioning engineer or contractor can show you how to whip both problems—*with a Bryant Dehumidifier.*

P.S.—The Bryant Dehumidifier also solves humidity problems in packaging rooms, storage rooms, or wherever it is necessary to prevent moisture regain in hygroscopic foodstuffs.

Bryant

DEHUMIDIFIERS

THE BRYANT HEATER COMPANY
17825 St. Clair Ave., Cleveland, Ohio

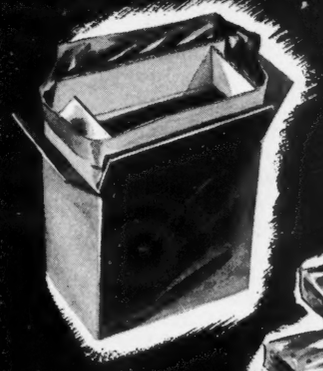
Protection!

MILPRINT PACKAGES *Safeguard* VITAL FOODS NEEDED FOR VICTORY

Protective Packages by Milprint are active on **two** fronts . . . safeguarding precious foods for our fighting men overseas and our allies . . . and replacing valuable metals in food packages being used at home.

Only a **few** of the many Milprint Protective Packages for food are shown here. Even though **your** product isn't illustrated . . . Milprint Packaging Engineers have designed . . . or can **create** . . . a package to meet your needs, too! In serving a nation at war, we are at your service!

OVERSEAS . . .



DEHYDRATED VEGETABLES for lend-lease shipments are packed in 5-gal. containers shown at left. Milprint is supplying the laminated pouch (to meet Quartermaster Corps specifications) used in this unit.

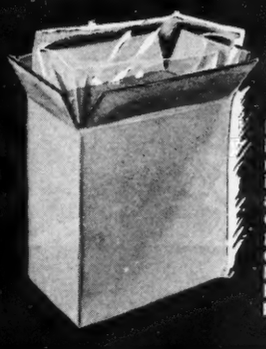
EMERGENCY RATIONS carried by our Army, contain many units protectively packaged by Milprint.

MILPRINT, Inc.

MILWAUKEE PHILADELPHIA LOS ANGELES

PACKAGING ENGINEERS TO A NATION AT WAR

ON THE HOME FRONT . . .



FROZEN EGGS, formerly shipped in tin cans, are now packed in corrugated containers lined with Milprint's Cellophane Seal-Liner Pouches.

DEHYDRATED SOUPS . . . today's best sellers . . . thanks to attractively printed laminated glassine pouches developed by Milprint.

LARD tins for bulk shipment are replaced by Milprint's Cellophane Seal-Liner Pouch used as a liner for corrugated outer container.

FOOD DEHYDRATORS, Attention!

H. C. BAXTER & BRO.

A PARTNERSHIP

OVER 50 YEARS CANNERS BAXTER'S FINEST BRUNSWICK, MAINE, U.S.A.

March 10, 1943

Proctor & Schwartz Inc.,
7th St. & Tabor Road,
Philadelphia, Penn.

Attention: Mr. A. O. Hurxthal,
Vice President.

Dear Mr. Hurxthal:

We have had your continuous Vegetable Dryer in operation for three months. In that this was to us a new enterprise, and one about which so little definite information was available, it was not to be wondered at that we had many problems to solve. You will be glad, I am sure, to learn that while none of us yet claim to be "experts", nevertheless most of the answers to these problems have been found, and altho undoubtedly we will continue to improve our technique, we are today efficiently producing a highly satisfactory product.

When we entered into contract with you last July, you made certain guarantees concerning the performance of your Dryer. To date the Dryer has exceeded its guaranteed performance. You claimed that because of the automatic features of the Dryer our labor cost of operating would be low. The statement you made at our first meeting in Portland to the effect that "the only thing Proctor & Schwartz didn't furnish was a rocking-chair for the operator of the machine to sit in!" was indeed prophetic. You also indicated a willingness to assist us in developing a satisfactory operation of our whole Dehydration setup. You and your men have been of incalculable assistance in solving many of our problems and we owe you a debt of gratitude for your exceedingly effective co-operation. This has played no little part in enabling us to be the first in this section and one of the first in the country actually to produce food which is essential to the prosecution of this war.

RUPERT H. BAXTER
JOHN L. BAXTER
BRUCE H. M. WHITE
F. WEBSTER BROWNE

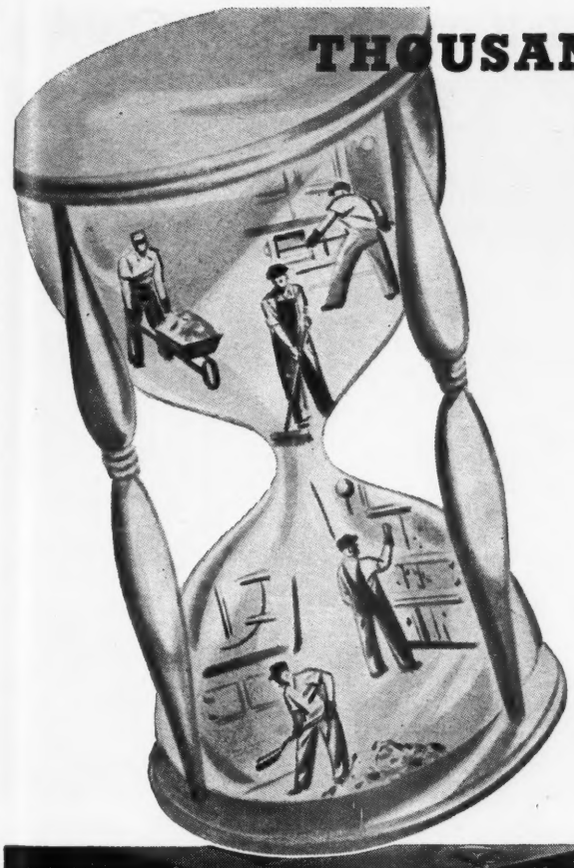
We feel extremely fortunate in having made the decision to purchase our first dehydration equipment from you. We believe Dehydration of Food will prove to be not only an important factor in the winning of this war but that it will favorably affect the eating habits of many peoples all over the world in the years to come. As we need and can use additional equipment we will automatically turn to you and feel certain that you will have or will make for us what we need. We will continue to refer to you and your staff questions that bother us, tho we hope it will not be necessary to take undue advantage of your kind offer of consultation service.

Sincerely yours,

H. C. BAXTER & BRO.

F. Webster Browne.

PROCTOR & SCHWARTZ • INC • PHILADELPHIA



THOUSANDS OF BOILER-ROOM *Man hours Saved*

FOR WARTIME PRODUCTION

In scores of industrial plants, Cleaver-Brooks Steam Generators have saved thousands of boiler room man-hours, because these modern oil-fired units, equipped with automatic controls, do not require full time attention and their clean, smokeless operation reduces to a minimum the usual labor time incidental to flue cleaning, stoking fires, wheeling ashes, cleaning the boiler room and other maintenance.

The Cleaver-Brooks Steam Generator offers other basic advantages:

—high thermal efficiency — no less than 80% guaranteed.

—compact "packaged" construction saves space.

—clean — no smoke, no ashes, no clinkers — a kitchen-clean boiler room at all times.

—four-pass, down-draft construction gets all possible heat from fuel.

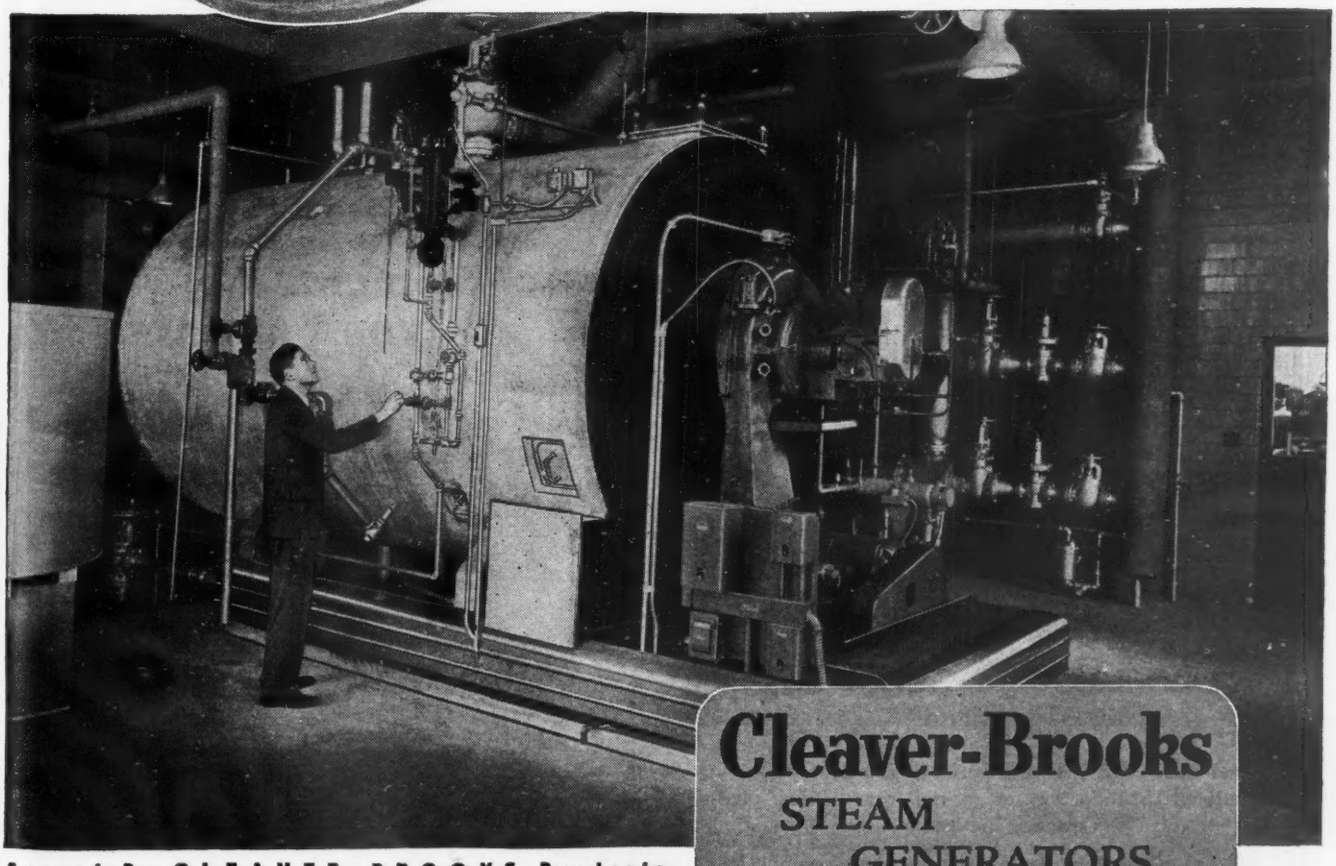
—positive blower air supply eliminates high, costly stack.

—performance-tested, fully assembled, by manufacturer.

—built by one company — Cleaver-Brooks, one centralized responsibility.

Whatever your present or future need for steam—within the range of capacity of a single installation (20 to 500 HP.—pressures 15 to 200 lbs.) or that of a battery of Cleaver-Brooks Steam Generators, secure full information now in anticipation of the time when normal conditions return.

CLEAVER-BROOKS COMPANY, 5103 N. 33rd St., Milwaukee, Wis., U.S.A.



Cleaver-Brooks
STEAM GENERATORS

Served By **CLEAVER-BROOKS** *Products*

Factory

Farm

Highway

Institution

Military

DEHYDRATION ... for Uniform, Highest Quality

NIAGARA Aero
FOOD DEHYDRATOR

● Trustworthy control of temperature, relative humidity and uniform distribution and movement of air are vital requirements of successful dehydration of all food products.

When temperatures within the dryer are controlled by scientific design to a tolerance of 1° at all points, with relative humidities in proportion, quality is improved, production increased and operating costs lowered.

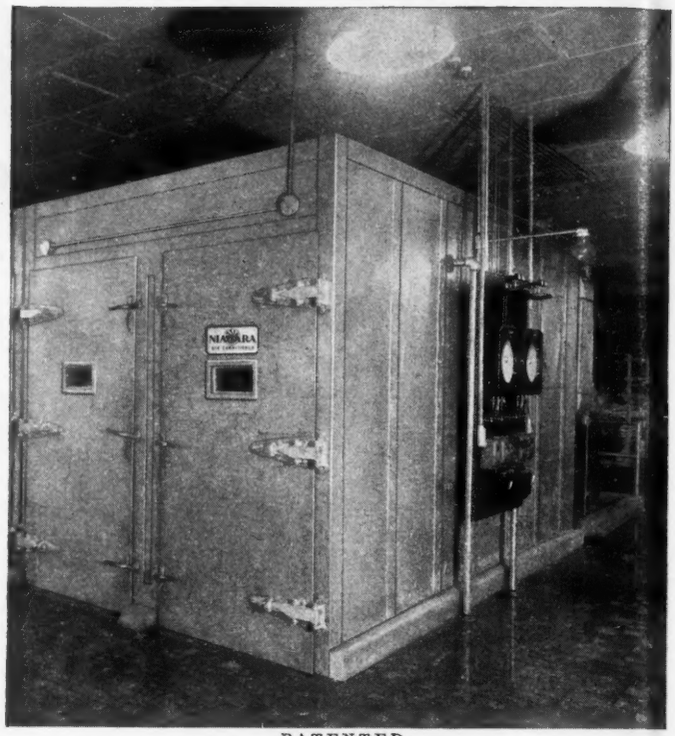
Years of experience with precision air conditioning for the most exacting uses assure these results with NIAGARA Equipment.

NIAGARA BLOWER COMPANY

General Sales Offices: 6 E. 45th St., New York City

37 W. Van Buren St. Chicago — Fourth & Cherry Bldg. Seattle

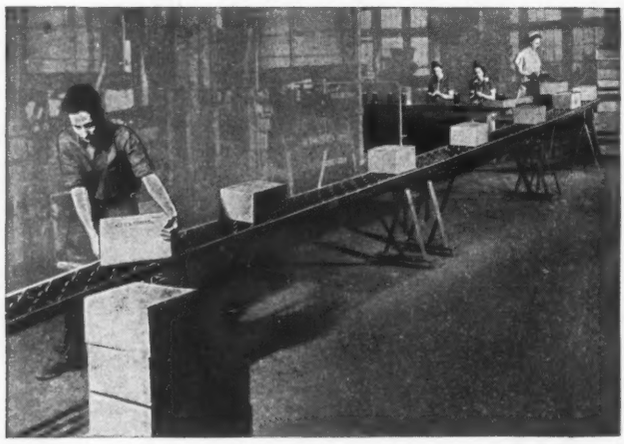
District Engineers in Principal Cities



PATENTED

NIAGARA EQUIPMENT FOR FOOD INDUSTRIES: AIR CONDITIONERS, DEHYDRATORS, COOLERS, "NO-FROST" METHOD OF PRE-COOLING, FREEZING AND HOLDING, AERO HEAT EXCHANGERS, "DUO-PASS" AERO CONDENSERS

NEW PORTABLE CONVEYOR
SPEEDS PACKAGE HANDLING



Buschman ROLL-OR-WHEEL portable conveyors speed package handling in production, or to and from loading platforms, trucks, box cars, stockrooms and warehouses.

In 10-foot, straight or curved sections—coupled to any length—roller or wheel equipped—easel, caster or tripod supports—quickly, easily set up, or moved from place to place where needed. Ideal for narrow aisles, crowded quarters.

Write for Bulletin No. 8, showing many applications.

THE E. W. BUSCHMAN COMPANY, INC.
417 NEW STREET **CINCINNATI, O.**

IMPORTANT
WHEN YOU CHANGE YOUR ADDRESS . . .

Unlike first-class mail, periodicals are not forwarded to a new address unless the subscriber pays the additional postage.

You can avoid this annoyance—and receive your copies of FOOD INDUSTRIES promptly upon publication, by advising us of any change of address at your earliest convenience.

NAME .....

NEW HOME ADDRESS.....

CITY & STATE.....

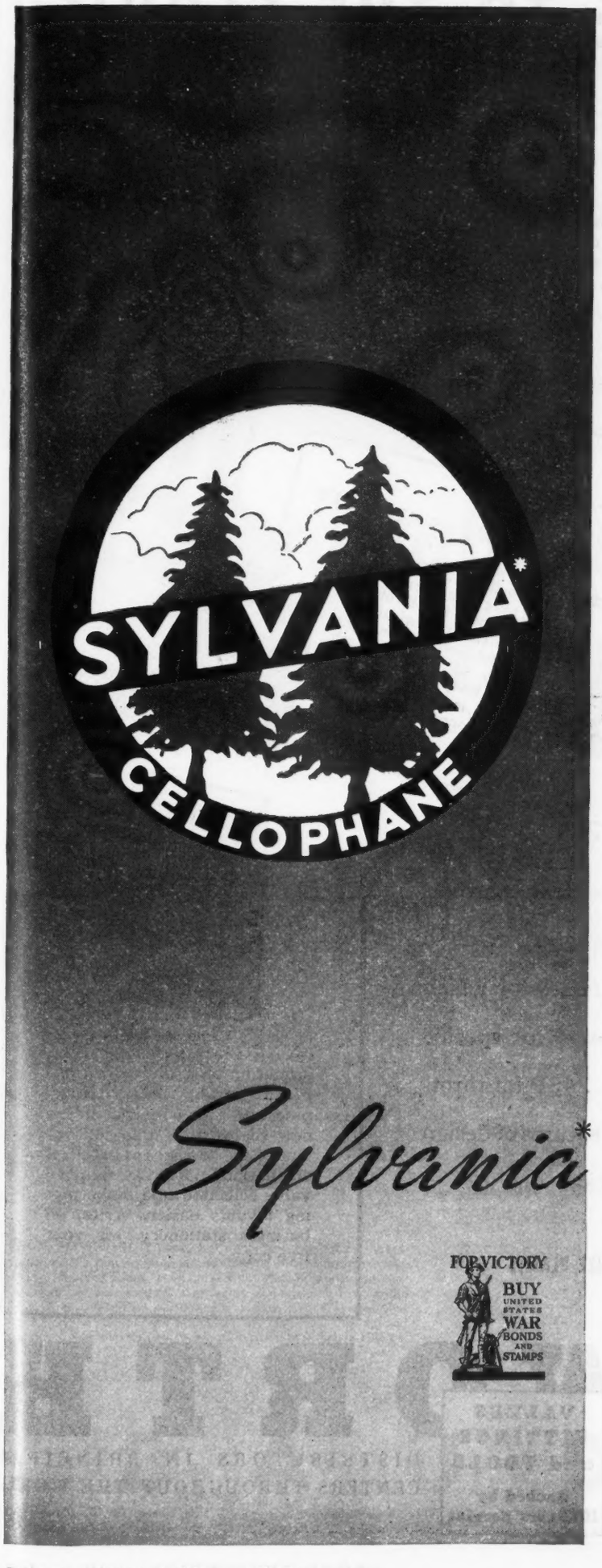
PRESENT POSITION.....

COMPANY .....

OLD ADDRESS.....

CITY & STATE.....

FOOD INDUSTRIES
330 West 42 Street **New York, N. Y.**



VICTORY FIRST

Sylvania* Cellophane, so well known for the protection it gives to perishables, is now being used in increasing quantity for many new and very important military requirements. Sylvania* Cellophane is being produced as before, and when Victory comes it will again be yours to use and enjoy.

Sylvania* Cellophane

SYLVANIA INDUSTRIAL CORPORATION

General Sales Offices: 122 E. 42nd Street, New York City

Works and Principal Offices: Fredericksburg, Va.

We of Sylvania Cellophane are proud of our Army-Navy "E" pennant . . . and the responsibility attached to our keeping it flying!*

Reg. U.S. Pat. Off.

FIT THE VALVE TO THE SERVICE

WHERE THROTTLING IS NOT REQUIRED

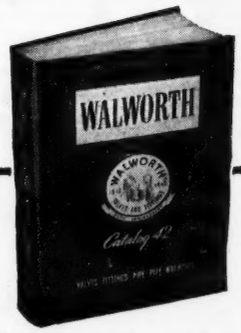
Walworth No. 95 Re-New-Disc Bronze Globe Valve saves time and trouble in changing discs because of the lock-on, slip-off disc holder originated by Walworth. It's an ideal globe valve for use where throttling is not required. General purpose discs are regularly furnished, and special discs are available for unusual services.

WHERE THROTTLING IS REQUIRED

Walworth No. 245P, with its hard plug type disc and seat, is designed for throttling service. It resists "wire drawing" and lasts longer. Like the No. 95, extra strength in the body-to-bonnet connection is obtained by the union bonnet design.

Walworth No. 95 and Walworth No. 245P are two excellent valves for general service. They are well designed, made to precision standards, and proved in the services for which they are recommended. They are engineered for specific purposes . . . No. 95 for general service, No. 245P for throttling service . . . and each has its distinctive features of design and construction. *Fit the valve to the service.*

BOSTON AND KEWANEE PLANTS



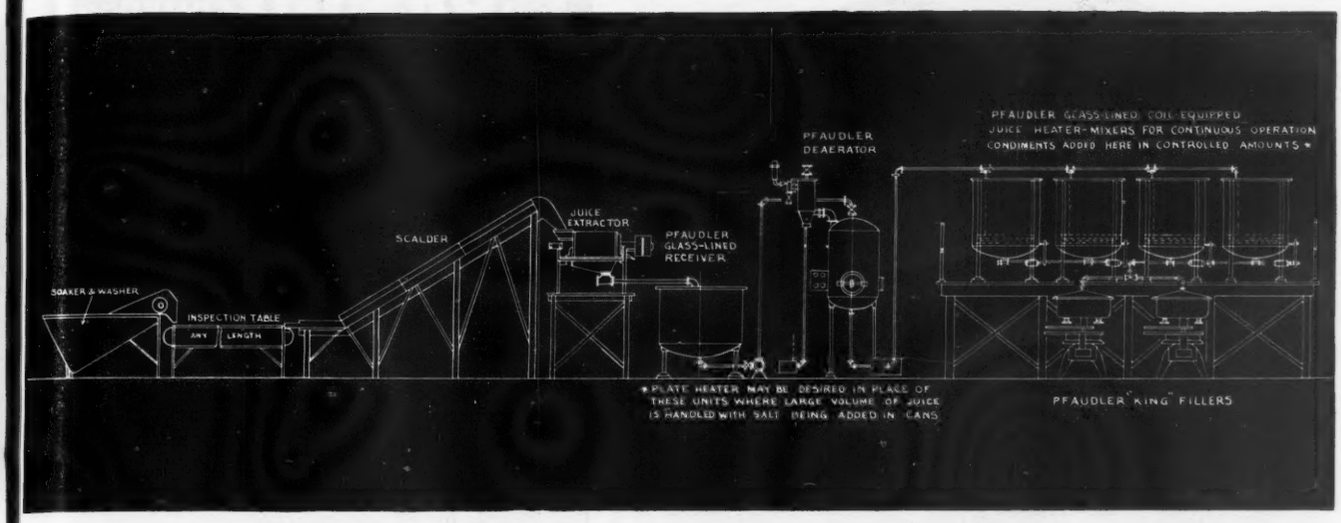
To help you "fit the valve to the service," you'll find pertinent information on Walworth's *complete line* of valves, fittings, pipe, and pipe wrenches in the new Walworth Catalog 42. Included are 78 pages of practical engineering data that simplify valve selection and make piping layouts easier. Write, on business stationery, for your free copy.

WALWORTH

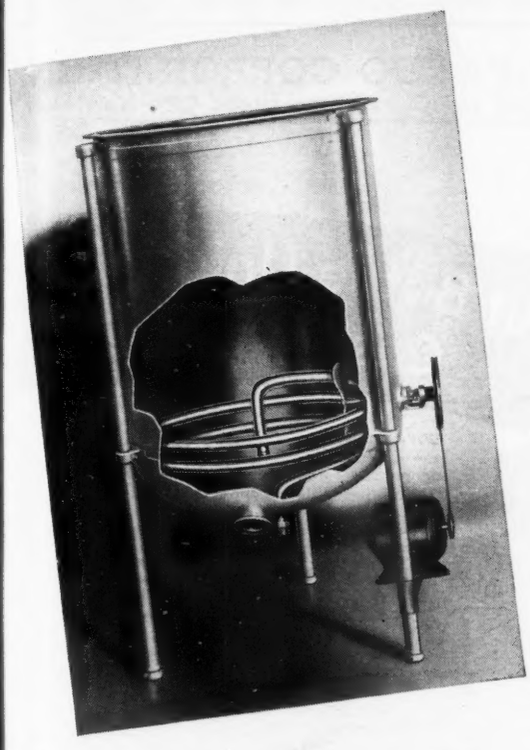
WALWORTH COMPANY
60 EAST 42nd STREET, NEW YORK

VALVES FITTINGS and TOOLS
Backed by 101 Years' Service

DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD


SOAKER & WASHER
INSPECTION TABLE
ANY LENGTH
SCALDER
JUICE EXTRACTOR
PFAUDLER GLASS-LINED RECEIVER
PFAUDLER DEAERATOR
PFAUDLER GLASS-LINED COIL EQUIPPED JUICE HEATER-MIXERS FOR CONTINUOUS OPERATION CONDIMENTS ADDED HERE IN CONTROLLED AMOUNTS.*
*PLATE HEATER MAY BE DESIRED IN PLACE OF THESE UNITS WHERE LARGE VOLUME OF JUICE IS HANDLED WITH SALT BEING ADDED IN CANS
PFAUDLER "KING" FILLERS

Handle tomato juice quickly!



KWIK-MIX HEATER—Rapid even heating necessary for the preparation of top quality tomato juice is one of the outstanding characteristics of the Pfaudler Glass-Lined Steel Kwik-Mix. While the agitator is optional, its use assures good circulation of the product across the heating coil at a rate that permits a maximum heat transfer. Coil heating area of 60 gallon size is 500 sq. in.; 100 gal. 653 sq. in.; 200 and 300 gal. sizes 1442 sq. in. Maximum coil pressure is 100 lbs. per sq. in.

MINUTES count when you pack tomato juice. Oxidation can ruin flavor and vitamin content in a hurry. These natural actions start so rapidly that deterioration of the juice is accelerated as it is cycloned.

The flow sheet above typifies a layout designed by Pfaudler engineers which minimizes these troubles. As shown, 2,680 gallons of finished tomato juice can be produced in an hour. The cycloned juice runs directly into a balance tank, is then pumped into the deaerator. There, occluded air and vapor are removed by flashing. The juice is pumped to a series of "Kwik-Mix" heater-mixers (for continuous flow) at which point controlled amounts of salt or condiments are added.

The capacity of the assembly can be varied, depending on the number of "Kwik-Mix" units used; or a plate heater may be substituted. If the later is used, this requires the addition of salt tablets to each can.

Any of the Pfaudler equipment shown above may be obtained of either glass-lined steel or stainless steel construction with the proper priority. This system has proved rapid and fool-proof, will enable you to step up production of this vital war food. Let us work with you. There's no time to lose.

Pfaudler

P F A U D L E R

THE PFAUDLER CO., Rochester, N. Y. Branch Offices: 330 West 42nd St., New York, N. Y.; 1442 Conway Bldg., Chicago, Ill.; 1325 Howard St., San Francisco, Calif.; 455 Paul Brown Bldg., St. Louis, Mo.; 7310 Woodward Ave., Detroit, Mich.; 1318-1st Nat'l Bank Bldg., Cincinnati, O.; 1228 Commercial Trs. Bldg., Philadelphia, Pa.; 751 Little Bldg., Boston, Mass.

CLOSE WATCH
ON TEMPERATURES

To save time and prevent production holdups . . . to preserve uniform quality of product . . . to avoid excessive heating or cooling costs . . . mount MOTOCO Indicating Thermometers at every point in the plant where uniform temperatures should be maintained. These accurate indicating instruments serve to simplify temperature observations . . . the indicating head may be mounted where observation is most convenient, at some distance, if necessary, from where the temperature is taken.

For further information write to: The Electric Auto-Lite Company, Moto Meter Gauge & Equipment Division, Chrysler Building, New York, N. Y.

MOTOCO Indicating Thermometers have rigid stems for direct mounting or may be obtained with capillary tubing for remote reading. Model F-1, illustrated. $20.

MOTOCO
INDUSTRIAL THERMOMETERS

X-PANDO PIPE JOINT COMPOUND

One formula for all uses—corrects imperfections in threads—smooths flange faces—expands and contracts with pipe movement—withstands pressure—holds anything carried in metal pipe except some heavy acids—economical, goes four to six times further than ordinary compounds—ends leaks permanently in all types of lines.

EXPANDS AS IT SETS

Distributors Everywhere • Ask Your Local Mill Supply House

X-PANDO CORPORATION
43-15 36th Street, Long Island City, New York

Cut Bottle Unloading Cost in Half

With a Styl-O-Matic Infeed and Unscrambling Table, one operator can unload 150 of any size bottles, jars or containers per minute from cartons onto conveyor feeding the filler without breakage—more than two can handle by hand. This reduces labor costs, increases production, saves breakage and floor space. Moreover, operator doesn't touch mouth of bottles, so sanitation is a reality. *Write for folder.*

ISLAND EQUIPMENT & SUPPLY CO., INC.
101 Park Ave., New York, N. Y.

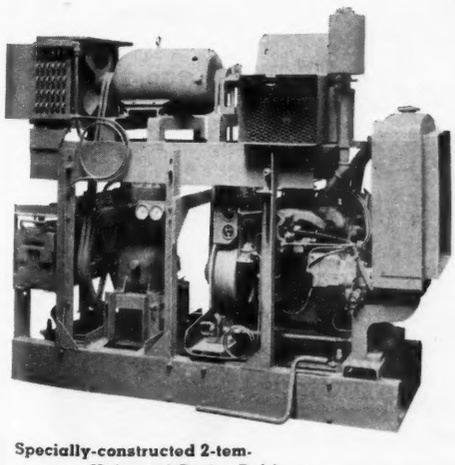
Unloading jars from carton on STYL-O-MATIC, *which discharges them to filler in single line.*

Styl-O-Matic Table

...Refrigeration is our business

Whether it's 10° for frozen foods or 35° for perishable chow; whether in prefabricated cold storage warehouses, at permanent bases or aboard ship, Universal Cooler Refrigerating Units are providing sure protection for the fighting foods our sailors and marines must have. Specially-constructed refrigerating units for the Navy Bureau of Aeronautics, 2-temperature mobile units for the Marines and water-cooling units for ship and shore also are included in the "orders of the day" at Universal Cooler.

At present our 23 years of specialized experience are devoted primarily to advancing the efficiency and production of refrigerating units for America's armed forces. But we also have delegated special facilities to accomplish the same purpose for your part in John Q. Public's postwar Victory plans. These engineering-research facilities are at *your* disposal NOW.



Specially-constructed 2-temperature Universal Cooler Refrigerating Unit, typical of those now serving with the United States Navy around the world.

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UNIVERSAL COOLER — WE SELL TO MANUFACTURERS ONLY

UNIVERSAL COOLER CORPORATION • *Automatic Refrigeration since 1922*

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INVEST IN VICTORY . . . BUY WAR BONDS AND STAMPS

THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE · DIESEL

GOOD NEWS For Plants Needing Modern Food Dehydrator

The Moore Cross-Circulation Dehydrator can be designed to meet any required capacity—for the small plant or large 24-hour-a-day operations.

Temperature, humidity and circulation under positive automatic control . . . drying zones independently controlled . . . better quality dehydrated product . . . minimum use of critical materials . . . individually designed to meet your requirements.

More than 60 years' experience in designing and manufacturing efficient dryers. Write today—no obligation.

MOORE DRY KILN COMPANY

Jacksonville, Fla.
Vancouver, B.C., Canada
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And Now—For Cooking Oil!

The perfect package!

"Glass" with the Gutmann Filma-Seal closure.

The closure is applied in one operation, screw cap and inner seal together.

It makes the ideal package.

- √ tamper-proof
- √ leak-proof
- √ evaporation-proof
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(Reg. U.S. Pat.)

Filma-Seal

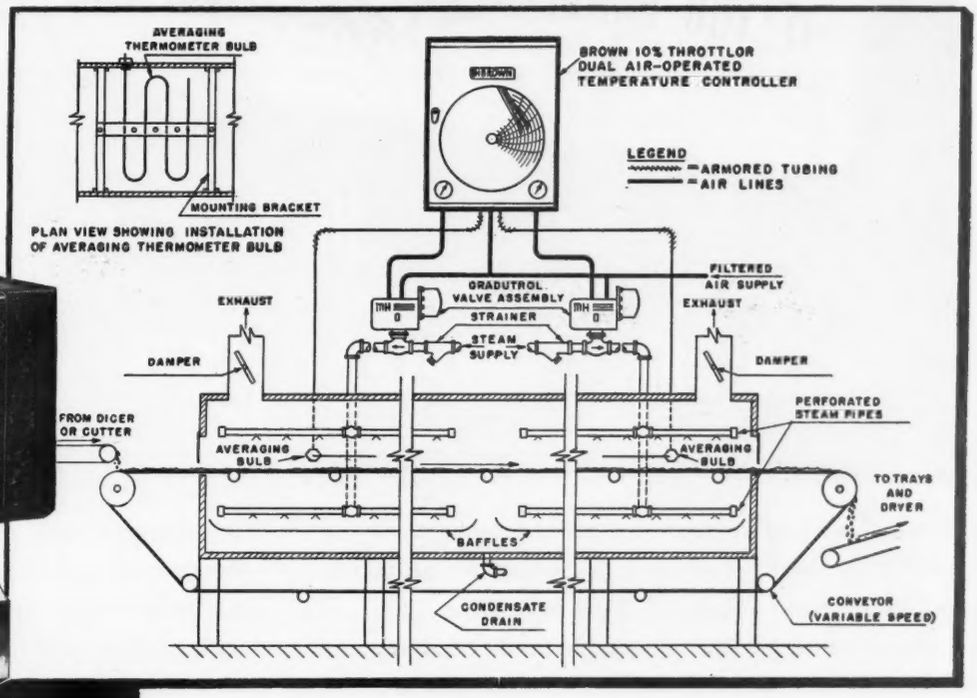
FERDINAND Gutmann & COMPANY SINCE 1850

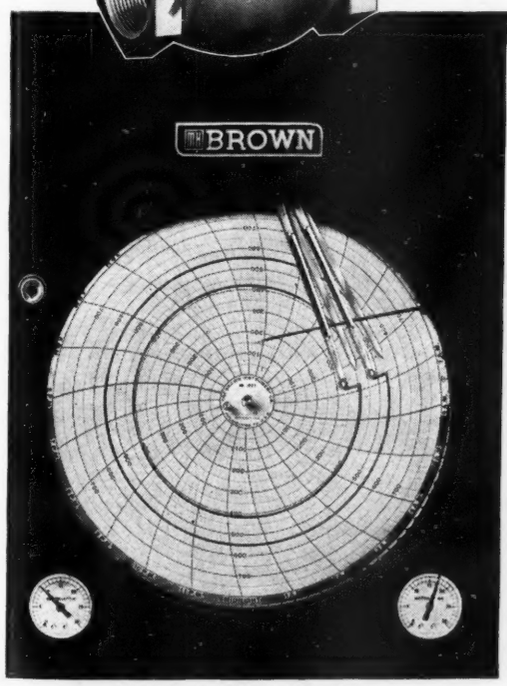
3611 14TH AVE., BROOKLYN, N. Y.

Assures Complete Enzyme Inactivation in

DEHYDRATION

GRAD-U-TROL VALVE
For details write for catalog 8301.





BROWN 10% THROTTLOR DUAL AIR-OPERATED TEMPERATURE CONTROLLER. *For details write for catalog 8903.*

ALL dehydrated vegetables accepted by government agencies must show a negative test for harmful enzymes.

In the blanching process, precision control is essential to inactivate harmful enzymes which cause deterioration, change in color, odor, texture, and loss of vitamins.

If the blanching process is not accurately controlled, either enzyme inactivation is incomplete or the vegetables are overcooked.

Brown and Minneapolis-Honeywell Controls maintain the correct temperature in the blancher, hold steam consumption to a minimum.

The illustration above shows a typical atmospheric steam blancher, equipped with Brown and Minneapolis-Honeywell Temperature Controls which assure maximum production and quality by eliminating breakage of outer membranes—overcooked vegetables—splits and improper skin removal.

In purchasing dehydration equipment ask for Brown and Minneapolis-Honeywell Controls. Catalogs sent on request. Write THE BROWN INSTRUMENT COMPANY, 4502 Wayne Avenue, Philadelphia, Pennsylvania, a division of Minneapolis-Honeywell Regulator Company, Minneapolis, Minnesota. Offices in all principal cities. 119 Peter Street, Toronto, Canada—Wadsworth Road, Perivale, Middlesex, England—Nybrokajen 7, Stockholm, Sweden.

Instruments by **BROWN** *and Controls by*

MINNEAPOLIS-HONEYWELL

IF YOU HANDLE... *liquids that are corrosive* / *liquors that must not be contaminated*

Be SURE you are SAFE;

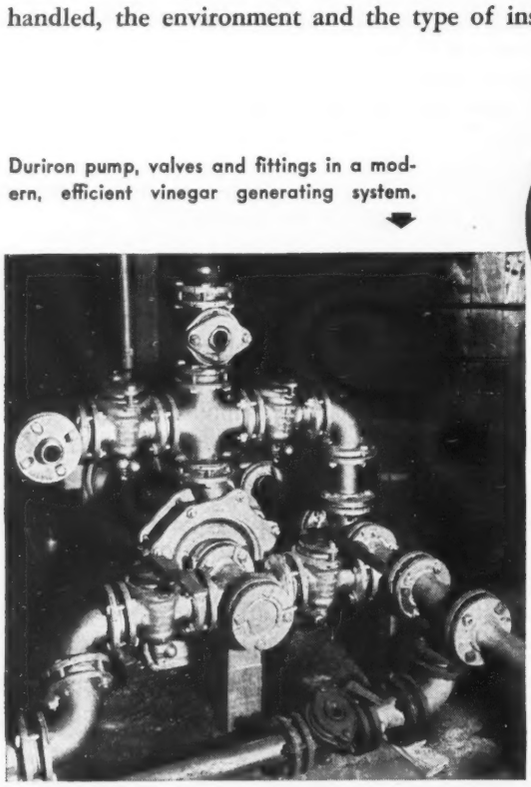
Install DURCO PUMPS · VALVES · PIPE and FITTINGS

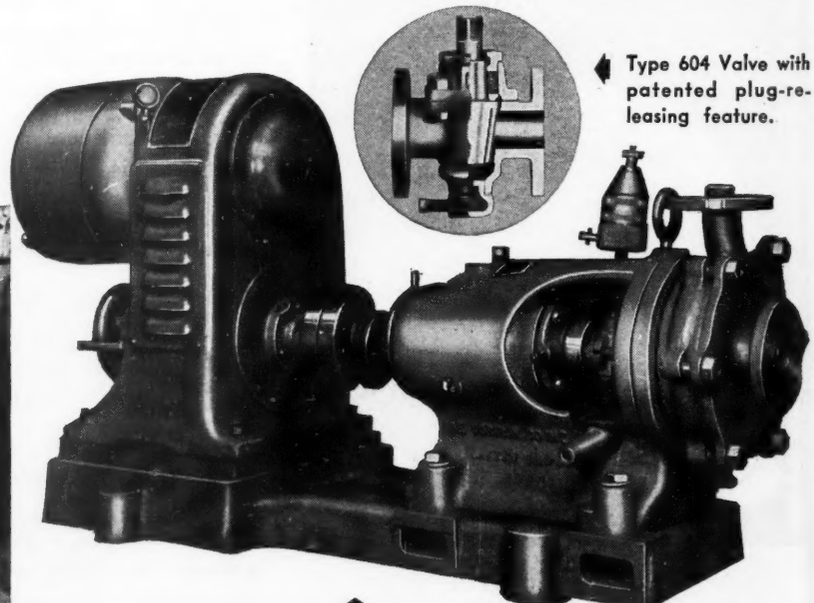
The nation's leading food processors long ago put Durco products through the acid test. They know they are taking no chances when they install Durco equipment.

Durco Pumps and valves are made of Duriron, Durichlor, Durimet and the Durco Stainless Steels. The proper alloy depends upon the corrosive solution to be handled, the environment and the type of installation. They are universally used for acetic, tartaric, citric and other concentrated acids; vinegars; sweet and dill liquors; fruit juices; tomato products; wines and brines. They are highly resistant to abrasion and scouring — no danger of contamination from iron pick-up.

Ask for the new 32-page bulletin on Valves, the one on Stainless Steel Pumps or Duriron-Durichlor Pumps.

Duriron pump, valves and fittings in a modern, efficient vinegar generating system.





Type 604 Valve with patented plug-releasing feature.

Above pump used by one of the foremost food canners for filtering fruit salad liquor. Equipped with Vari-Speed motor, permitting perfect control of pressure up to 75 lbs. per sq. in. At lower speeds, used on transfer service.

ARMY E NAVY

DURIRON · DURICHLOR · DURCO · ALLOYS & EQUIPMENT · THE DURIRON CO. INC. DAYTON, OHIO · DURIMET · DURCO STAINLESS STEELS

THE DURIRON COMPANY INC.

DAYTON, OHIO

"What are you giving me...Post-war planning?"

No plant engineer likes to tell the boss these days that he's got to have a new refrigeration compressor. Maybe the boss will get sarcastic and ask if he'd like a set of new tires and a couple of pounds of butter with it, or maybe he'll merely blow up. It's certain no one is going to enjoy the conference much.

The best known protection against such scenes is the York Maintenance Contract, under which the York Inspector tunes your refrigeration plant up to concert pitch ... *and keeps it there.*

A flat fee per month places on York full responsibility for continuous and *efficient* operation that saves you money from the start in reduced power and water costs. In preventing breakdowns and obsolescence, the Maintenance Contract conserves critical materials, yet it makes available to you through periodic inspections and check-ups genuine York renewal parts, belts, motors, refrigerants, insulating materials.

Nothing at this time can be more important to the security of your plant. We urge you to send the coupon below for complete information. York Ice Machinery Corporation, York, Pennsylvania.

YORK REFRIGERATION AND AIR CONDITIONING FOR WAR

HEADQUARTERS FOR MECHANICAL COOLING SINCE 1885

york refrigeration air conditioning — Certified MAINTENANCE

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YORK ICE MACHINERY CORP., YORK, PENNA.

I am interested in learning more about the York Certified Maintenance Contract.

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There is no time for production hold-ups where heat exchangers are made,—so Carpenter Welded Stainless Tubing helps to "get 'em out faster"—and better.

HOW THESE UNIFORM TUBE WALLS help to boost OUTPUT and conserve metals

The *uniform wall thickness* of this Welded Stainless Tubing permits the use of lighter gauges without sacrificing strength. And *lighter gauges* mean easier forming, cutting and welding . . . an important plus wherever skilled workers are at a premium! Then too, the use of Welded Stainless Tubing, pioneered by Carpenter, helps to conserve metal.

Longer service life is one feature of equipment and parts made from Carpenter Welded Stainless Tubing. There are no thin spots to "give out" as a result of constant heat, corrosion, pressure or wear.

If you would like help in applying this tubing to your design or production problems, let us know. Carpenter's service representatives can help you get the most from Welded Stainless Tubing.

If you use Welded Stainless Tubing, or are planning its use, ask for Carpenter's QUICK FACTS bulletins. A note on your company letterhead will start them on the way — to help you use this Welded Stainless Tubing to best advantage.

Carpenter Welded Stainless Tubing *resists corrosion, heat and wear; meets Government specifications; is 100% hydrostatically tested; has a high strength/weight ratio.*

THE CARPENTER STEEL COMPANY
Welded Alloy Tube Division *Kenilworth, N. J.*

Carpenter WELDED STAINLESS TUBING

PORTABLE sectional belt conveyors are ideal for handling boxes, crates, packages, parts, etc., in warehousing and shipping . . are proving themselves on hundreds of jobs in the present emergency where speed is important. For top performance . . industry specifies Jeffrey.

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MEET THE NEEDS OF DESIGNERS, BUILDERS AND USERS OF MACHINERY IN THE FOOD INDUSTRY

FULLERGRIPT Brushes for
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FLOUR MILLS
MEAT PACKING
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TO manufacturers and processors of Food: Wherever you use Brushes, consider Fullergript's enduring construction. Conveying equipment, wrapping and packaging, bottling and labeling machinery operate more efficiently with these sturdy, long wearing Brushes.

Also try our standard line of Floor Brushes, Dusters and the famous FULLER FIBER Broom.

The FULLER BRUSH Company
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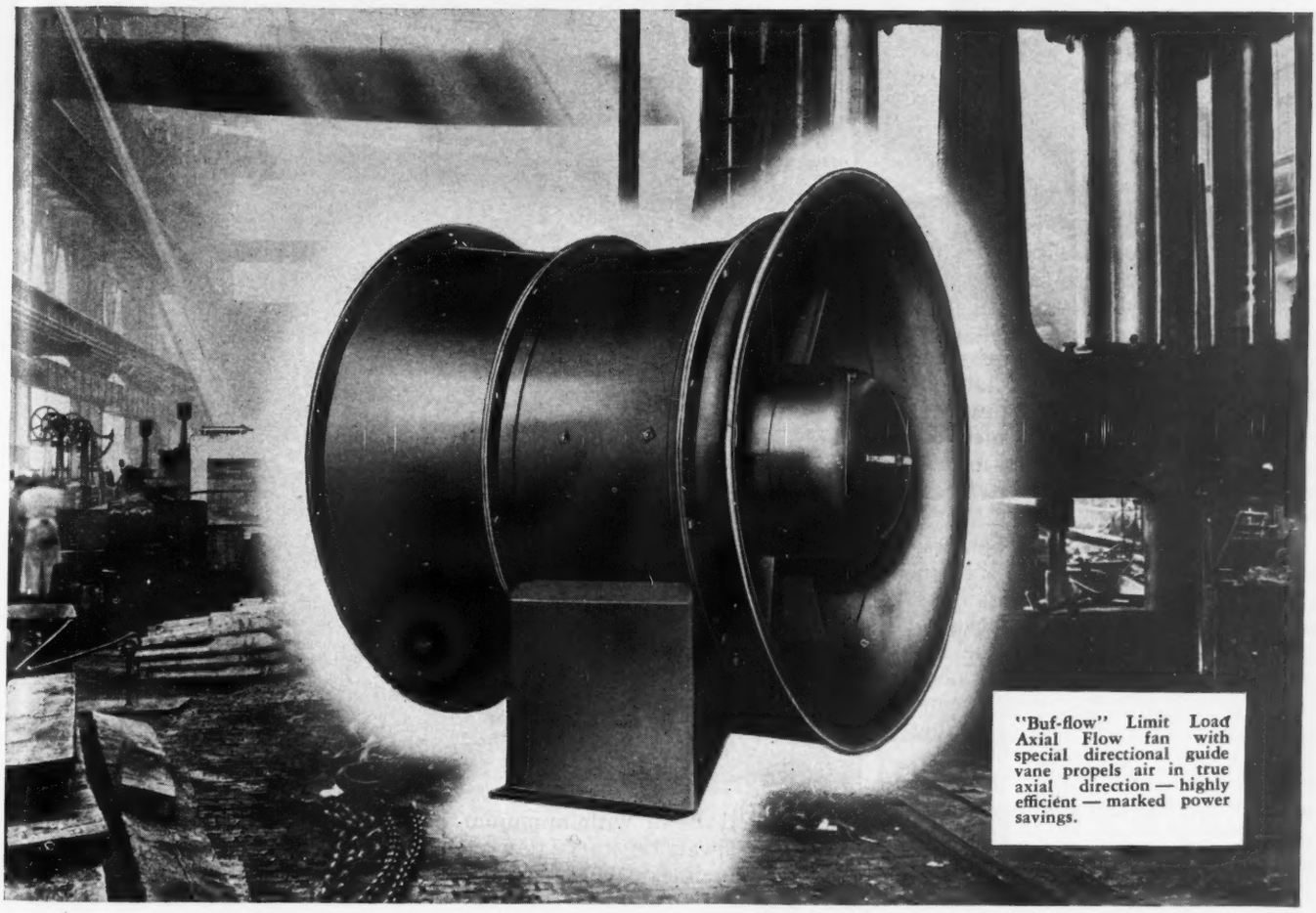
3592 MAIN STREET - HARTFORD, CONN.

The AIR, too, is a vital "Raw Material"



"Buf-flow" Limit Load Axial Flow fan with special directional guide vane propels air in true axial direction — highly efficient — marked power savings.

Clean, fresh air is playing a vital role in helping forge out the armament for Victory . . . Air for ventilation . . . air for warmth . . . air for exhausting fumes and waste . . . air for boiler draft—in countless ways Buffalo Fans are supplying air to maintain better workmanship and faster production. Engineered for sustained periods of continuous operation, Buffalo Fans serve quietly, economically and with a minimum of attention. In war, as in peace, industry safely relies on Buffalo!

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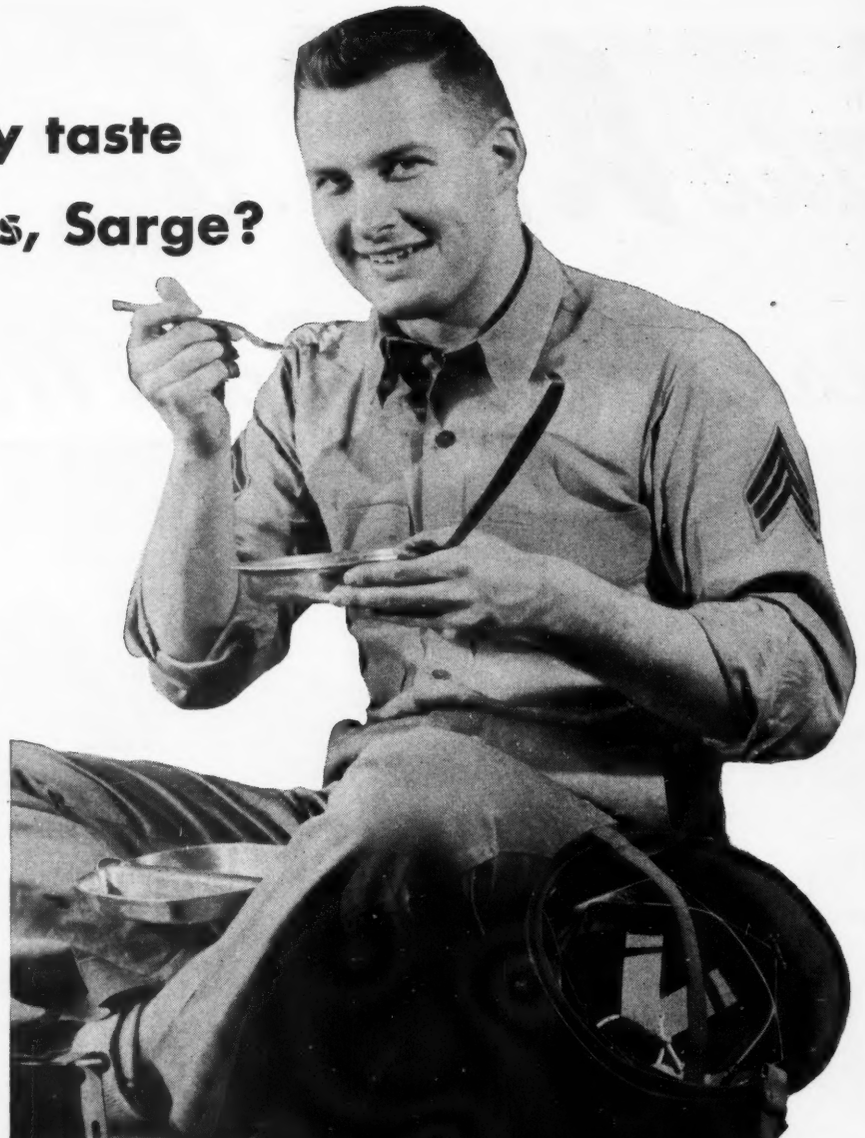
152 MORTIMER ST. BUFFALO, N. Y.

Branch Engineering Offices in Principal Cities

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo" VENTILATING FANS

Does it really taste like Ham'n Eggs, Sarge?



"You betcha!..."

The sergeant, you see, is enjoying a mess kit full of U. S. Army Ration "K"—ham 'n eggs to you! It came to him in a can from Pittsburgh, half way 'round the world. No, it's not quite the same as mother's ham 'n eggs, fresh from the pan. But the tangy taste of ham is there, blended with the nutritious goodness of selected eggs. It's a real treat for a hungry soldier!

Like many other foods for fighters, Ration "K" gets off to a safe start in the absolute cleanliness of stainless steel cooking equipment. Its keeping qualities and nutritional value are protected, because stainless is nontoxic and will not cause metallic contamination. There is nothing in this lustrous metal to damage food flavors or colors. So Ration "K" gets where it's going just the way it was packed—full of appetizing goodness and wholesome food value.

The pressure of war production is accenting the advantages of U·S·S Stainless Steel wherever foodstuffs come in contact with metal during processing operations. Food packers lucky enough to have stainless kettles, vats, evaporators, transfer lines and filling machines find that it not only protects food quality but saves precious time, too. Stainless can be kept immaculately clean with minimum labor. Its stalwart resistance to wear and corrosion means fewer repairs and better plant efficiency. And stainless never requires refinishing or replating.

Even though you may not be able to add new stainless equipment now, it's not too early to begin working out your plans for making the most of U·S·S Stainless Steel's advantages in your "plant of tomorrow."

AMERICAN STEEL & WIRE COMPANY, *Cleveland, Chicago and New York*
CARNEGIE-ILLINOIS STEEL CORPORATION, *Pittsburgh and Chicago*
COLUMBIA STEEL COMPANY, *San Francisco*
NATIONAL TUBE COMPANY, *Pittsburgh*
United States Steel Supply Company, Chicago, *Warehouse Distributors*
United States Steel Export Company, New York

U·S·S STAINLESS STEEL

"Be glad it's Stainless... it lasts longer!"

Sheets · Strip · Plates · Bars · Billets · Pipe · Tubes · Wire · Special Sections

UNITED STATES STEEL

SPEED FOOD PROCESSING AND PACKAGING!

Get Need Equipment QUICK—from

★★★★"CONSOLIDATED"★★★★

2—Pneumatic Scale Packaging Units.
1—Pneumatic Scale Automatic Wax Liners.
7—300 gal. Copper closed tin-coated Tanks.
1—J. H. Day #2 Brighton Mixer, 80 gal. cap.
6—8 to 40 gal. Pony Mixers.
15—Dry Powder Mixers, from 50 to 4000 lbs.
1—National auger type auto. Powder Filler.
2—80-qt. Century 4-speed Mixers, m.d.
1—Buffalo 48"x40" Bronze Rotary Vac. Drum Dryer.
3—28"x60" double drum B & C Atmospheric Dryer.
1—Buffalo 24" Vanilla Bean Chopper.
1—World 1-Ermold semi-auto. Labeling Machines.
2—Karl Kiefer Visco Filling Machines.
1—Johnson mod. JA Cellophane Wrapper.
11—Filter Presses P & F;Recessed;to 42" Square.
2—World Rotary Automatic Labeling Machines.
2—Mechanical 4x9' Lard Rolls, m.d.
1—#6 Sweetland Filter, 12 bronze leaves,3" c.c.
2—Sweetland Filters, 1—#6, 1—#7, 12 bronze leaves, 3" c.c.
17—Stainless Steel, Copper; Glass Lined; Kettles and Vacuum Pans, up to 550 gal. cap.
2—Schultz-O'Neil Pulverizers.
1—54"x45" Monel Lined Direct Heat Dryer.
3—K.K. & U.S. Rotary bottle Rinsers, m.d.
2—Premier 5" and 10" Colloid Mills, m.d.
1—5x35' Louisville Steam Tube Dryer.
1—Elgin 12-spout Rotary Piston Filler, S.S.
12—Copper Tanks to 7000 gal.
1—Johnson T & B Sealer Unit.
1—36" x 84" Double Drum Dryer.
2—O. & J. 7-place Rotary Labelers, m.d.
1—Stokes 500 gal. Copper Jack. agitated Vacuum Pan.

• *Send for "Consolidated News" listing complete stock.*

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Buy With Confidence — "Consolidated"

IMMEDIATE DELIVERY

TANKS • KETTLES

10 New Copper Jktd. Kettles; 200 gal. to 500 gal.
2 Pfaudler 50 gal. St. Jktd. Glass Lined Kettles, agitated
10 Steel Jktd. Agitated Pressure Tanks; 1100 gal.
1 Steel Jacketed Tank; 475 gal. 42" x 78"
1 Steel Rotary Digester; 3750 gal.; 6' x 17'6"
4 Jacketed Drop Kettles; about 50 gal.
1 Cone Bottom Jktd. Steel Tank; 550 gal.
1 100 Gal. Monel Tank, agitated; 28" x 44"
3 Glass Lined Agitated 200 gal. Tanks 41" x 42"

FIRST MACHINERY CORP.

FMC

9th ST. & EAST RIVER DRIVE, NEW YORK CITY

POSITIONS VACANT

WANTED: Food technologist for research and development of dehydrated meats and foods. Write age, training, experience and education. Young Progressive Eastern Corporation. P-124, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED—Factory Production Associate, under 40 if draft unlikely, food experience, bakery or kindred lines. Industrial Engineering or Chemical education desirable. Small, successful Chicago plant. Future permanent and promising. P-125, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

WANTED: Experienced production superintendent for canning company located Eastern Shore, Maryland, packing Tomato products, Beets and other vegetables. P-131, Food Industries, 330 W. 42nd St., New York, N. Y.

POSITIONS WANTED

TECHNOLOGIST with SB degree in Food Technology and with four years experience in analysis and inspection of canned foods desires position in quality control or production of canned or frozen foods. Married. Eastern location preferred. PW-126, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

CHEMIST-BACTERIOLOGIST, Diversified experience control, production management, and development in food industry. Graduate training in food technology. Age 27, draft deferred. Seek new position with opportunity for creative work. Member Institute Food Technology. PW-127, Food Industries, 330 W. 42nd St., New York, N. Y.

SPECIALIST in spray system dehydration equipment desires connection with food manufacturer. Can furnish portion of necessary equipment. Draft 3A, age 31, university graduate. PW-129, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

PRODUCTION SUPERINTENDENT—19 years experience in manufacturing of preserves, jams, jellies, marmalades, mince-meat, ketchup, sauces, honey, salad dressing, syrups, extracts, peanut butter, canned soups, stews, spaghetti, meats, sausage and other allied food products. Experienced in purchasing of raw materials, manufacturing, packing, costs, shipping etc. 5 years experience on government contracts. Married, have one child. Draft status 3A. Age 36. PW-128, Food Industries, 520 N. Michigan Ave., Chicago, Ill.

PICKLE MAN with experience from field to finished product in plant of 10,000 barrels year. PW-130, Food Industries, 330 W. 42nd St., New York, N. Y.

WANTED

NAILING MACHINES WANTED—We want **Morgan or Doig Nailing Machines at once. State make, size, best cash price. Chas. N. Braun Machinery Co., Fort Wayne, Indiana.**

FREE BULLETIN

GELB NEWS RECORD, a catalog listing many items of used equipment. Write to R. Gelb and Sons, Inc., Union, N. J. for your copy.

Food manufacturing plant wanted!

Will make large cash investment. State details.

BO-123, Food Industries
330 W. 42nd St., New York, N. Y.

FOR SALE

Used hydraulic presses for apple and other juices; used wooden filter presses, 32", 18" and 12" square, good condition; one used 24" square hard rubber filter press, 30 chambers; used bronze pumps; labeling machines.

SCIENTIFIC FILTER COMPANY
2 Franklin Square New York City

CONCENTRATED NATURAL FOOD

FORMULA AND PROCESS AVAILABLE

We have a 'concentrated natural food' that has been under research for many years.

This food is composed of various ingredients that are available in abundant quantities. The cost of production is extremely low.

It is the only food that contains complete chemical, biological and physiological life-giving properties.

It is the only food known to contain all of the dietary-essential amino acids.

The commercial merits of our product has the following values: (1) As a ration for the armed forces. (2) For the masses that now require more than ever the energy producing health and life-giving foods. (3) For convalescents and as a baby food. (4) It can be made into a spread, patties and be grilled. (5) It can be dehydrated. (6) It will withstand low and high temperatures and can be shipped to any part on the globe. (7) It does not age and time does not impair its quality. (8) It is palatable, appetizing and rich in nutrition. Write

M-122, Food Industries
520 No. Michigan Ave., Chicago, Ill.

WANTED

WANTED

DEHYDRATED VEGETABLES

for sale and distribution in the Baltimore area for use on ships as well as by manufacturers and wholesale consumers.

Send details, prices and packaging.

FLAVOREX COMPANY
1520 Ridgely Street, Baltimore, Md.

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UNDISPLAYED

10 cents a word, minimum $2.00.
Positions Wanted (full or part-time salaried employment only), ½ above rates, in advance.
Box Numbers care of our N. Y., Chicago or San Francisco office count 10 words addl.
Discount 10% for payment in advance for four consecutive insertions.

DISPLAYED

$6.00 per inch for all advertising other than contract. Contract rates on request.
AN ADVERTISING INCH is measured ⅞ inch vertically on 1 col., 3 col.—30 in.—to page.
NEW ADVERTISEMENTS received by April 19 will appear in the issue of May subject to space limitations. FI

WANTED

Up to 5000' roller gravity conveyor for cash. Send detailed description and price to the

Island Equipment & Supply Co., Inc.
101 Park Ave., New York, N. Y.

WANTED

2—Tablet Machines; 3—Filters.
2—Dry Powder Mixers, with or without Sifters.
2—Rotex Screens; 1—Packaging Machine; 1—Glass Lined Kettle; Stainless Steel, Monel, Copper or Aluminum Jacketed Kettle and Vacuum Pan.

W-132, Food Industries, 330 W. 42nd St., N. Y. C.

SEARCHLIGHT SECTION

WIN THE BATTLE OVER PRODUCTION DELAYS WITH UNION REBUILT GUARANTEED EQUIPMENT

UNION

Rebuilt Machinery

Established 1912

IN STOCK . . . READY FOR IMMEDIATE DELIVERY!

ALL OFFERINGS SUBJECT PRIOR SALE! Wire Collect For Prices & Details!

54" Copper Vacuum Pan, jacketed, complete with condenser, vacuum pump, etc., also 20 to 300 gal. sizes.
Wolf Steam Dryers consisting of 6 steam jacketed tubes with spiral ribbon conveyors.
Werner & Pfleiderer, 2,500 gal., double arm jacketed **Storage and Mixing Tanks.**
U. S. Bottlers 10 spout Model C-10 **Filling Machine,** 4 to 16 oz. cap.
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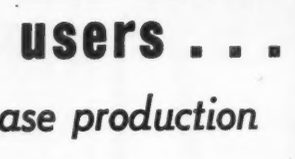

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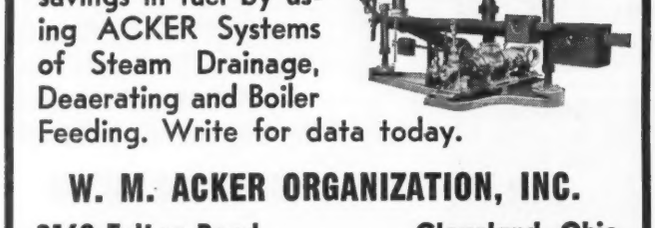

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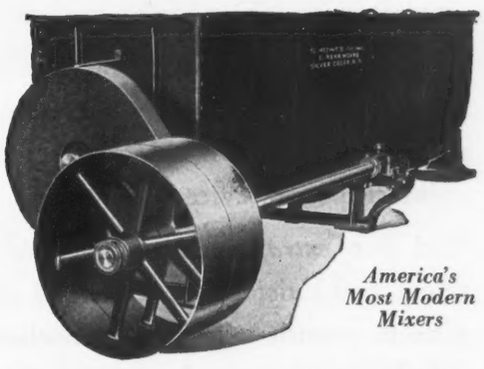

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Quicker, safer, cheaper mixing for all dry or semi-dry materials—uniformity for every batch . . . You save in power, labor, and up-keep expense when using a master-built 'even-mix 'Eureka'—your products go out perfectly blended, at smallest cost.

Ask for Catalog I-165.

S. HOWES CO., Inc., Silver Creek, N. Y.

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GLOBE STAINLESS TUBES

FOR HIGH CORROSION RESISTANCE PLUS EXTRA STRENGTH AT HIGH TEMPERATURES . . .

Precautions must be taken in the selection of stainless steel tubing to assure satisfactory resistance to varying conditions of wet and dry corrosion and to provide extra strength where high temperatures are encountered.

For severe service conditions Globe Seamless Stainless Steel Tubes offer known protection . . . known assurance of sanitation, safety, corrosion resistance and uninterrupted service.

And for *extra* assurance of *added* safety and satisfaction, let Globe engineers consult with yours in selecting the stainless steel tubes for your particular needs.

Globe Stainless Tubes are produced in a wide range of sizes and analyses of chrome and chrome-nickel alloys.

We are glad to work with your engineers on tubing problems—make recommendations based on long experience, verified by practical and laboratory tests.

GLOBE TUBES

★ STAINLESS TUBES
★ BOILER TUBES
★ GLOBEIRON TUBING
★ GLOWELD TUBES
★ CONDENSER AND HEAT EXCHANGER TUBES
★ MECHANICAL TUBING

GLOBE STEEL *Tubes*

3003

GLOBE STEEL TUBES CO., *Milwaukee, Wisconsin, U.S.A.*

Highest Award

1942 ALL-AMERICA PACKAGE COMPETITION

Take good taste, technical excellence, understanding of display and merchandising values —add them together and you have prize-winning packages like Fleetwood and Spud.

In the field of tobacco in the 1942 All-America Package Competition, they were first in the eyes of the judges—but better still, they are getting a big hand at the tobacco counters of America.

For both these accomplishments, *congratulations to The Axton-Fisher Tobacco Company!*

Naturally, we at Gardner-Richardson feel good about all this, too, for it was our privilege to produce the Fleetwood and Spud cartons.

The paperboard used in these cartons is our revolutionary new *Coated* Lithwite; the printing is an example of the every-day high standards which exist throughout the Gardner-Richardson plants.

The result is a sales-winning combination, as many large users of folding cartons know.

The GARDNER-RICHARDSON Co.

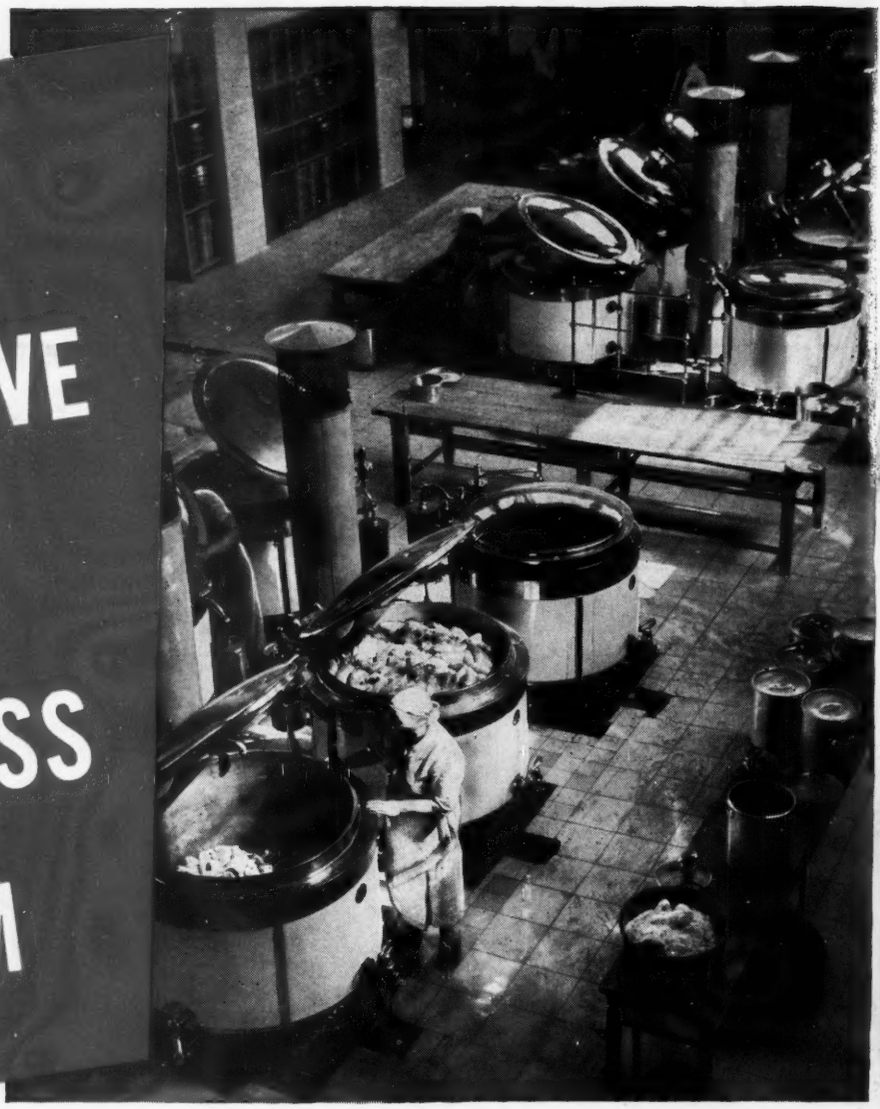
Manufacturers of Folding Cartons and Boxboard

MIDDLETOWN, OHIO

GARDNER-RICHARDSON — FROM PULP TO FINISHED PRODUCT — ENGINEERED PRECISION

Sales Representatives in Principal Cities: PHILADELPHIA • CLEVELAND • CHICAGO • ST. LOUIS • NEW YORK • BOSTON • PITTSBURGH • DETROIT

MORE EFFECTIVE USE OF PROCESS STEAM



WITH the need for ever greater output, the efficient use of exhaust steam becomes an important contribution to the Nation's war-effort.

You can provide an efficient source of heat for kettles, ovens, digesters, coils, retorts, mixers, dryers, etc., by using exhaust steam free from cylinder oil, when engines are lubricated with the proper grade of *Texaco Steam Cylinder Oil.*

Texaco Steam Cylinder Oils atomize completely, adhere to cylinder walls, assure low oil consumption, and separate rapidly from the exhaust.

So effective have Texaco Lubricants proved that they are definitely preferred in many important fields, a few of which are listed in panel.

A Texaco Lubrication Engineer will gladly cooperate in selecting the most efficient steam cylinder oil for your equipment . . . just phone the nearest of more than 2300 Texaco distributing points in the 48 States, or write to:

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★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

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★ More buses, more bus lines and more bus-miles are lubricated and fueled with Texaco than with any other brand.

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

TEXACO

TEXACO Steam Cylinder Oils

FOR EVERY STEAM CONDITION

TUNE IN FRED ALLEN EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY